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From a Natural Object to a Medical Resource: The Production of Knowledge about Petroleum by Johann Jacob Lerche

As the main tasks of the 18th-century Russian medicine were the support of the army and navy, and the protection of the empire from massive diseases, the regular research of local medical phenomena and resources was not clearly distinguished. The present paper attempts to reveal the ways in which medical knowledge was produced and communicated on the example of crude oil exploration by a Prussian physician in Russian service, Johann Jacob Lerche (1708–1780). Despite the fact that both his wide-ranging medical activities in different areas of the Russian empire and his extensive written heritage drew only fragmentary attention from scholars, they reflect the physician's expertise in the research of *naturalia* which he manifested while performing his professional duties. Crude oil was one of the most remarkable mineral wonders of the Pre-Caspian region which Lerche visited twice (1732–1735, 1745–1747). On the basis of his three published accounts, which contain information on petroleum qualities and its practical application, the author investigates how the Baku crude oil, a natural object, was reinvented as a medical resource by an 18th-century state physician in the Russian empire. It is done through the consideration of the processes of world discoveries in the Age of Enlightenment, and the indigenous practices of the oil use. Finally, the significance of the author's professional position as a state physician appears to have influenced the argumentation of curative qualities of petroleum and the advantages of its location.

Keywords: Johann Jacob Lerche, history of medicine, Russian Empire, petroleum, medical resources

Słowa kluczowe: Johann Jacob Lerche, historia medycyny, Cesarstwo Rosyjskie, ropa naftowa, surowce medyczne

A local remedy for a local disease

The 18th-century Russia appears to have been a place where the medical research agenda was not clearly announced with regard to preparing medical specialists or performing a medical profession. Indeed, epidemics and healthcare of the army and navy were major preoccupations of the state physicians in the imperial service. The main state medical

institutes, such as *Medicinskaya kancelyariya* (the Medical Chancellery) in St. Petersburg (from 1721 till its reorganisation into *Medicinskaya kollegiya* (the Medical Collegium) in 1763) and *Medicinskaya kontora* (the Medical Chamber) in Moscow, were primarily concerned with administrative tasks. Even the university-educated physicians, who were hired from abroad throughout the 18th century, mostly from Protestant universities, to perform high-ranked service in medical departments, were frequently not only placed to govern the medical sphere in St. Petersburg or Moscow but also sent to remote destinations due to military activities and mass diseases of humans and animals.¹ Relatively little professional medical personnel with theoretical knowledge was rather expected to support the abilities of the population to fight and to pay taxes.²

However, the intentions to protect the empire from the devastating diseases and to avoid the extensive import of foreign drug components needed the exploration of local medical phenomena and resources. As a field of practical significance, in early modern Europe, the making of this sort of medical knowledge was, to an extent, an artisan work of simultaneous observation of a disease, its treatment, and, particularly, the interpretation of medical action.³ In addition, the search for the ways of treatment was influenced by the growing significance of *observation* as a method for the study of natural phenomena, and it would be based on the results of personal observations rather than on the works of Ancient and Medieval classics of medical thought.⁴ How was this research undertaken in the 18th-century Russian Empire? More specifically, how were the academic views on health conditions and remedies for the health care of the diverse imperial population produced and spread?⁵

In that regard, it is noteworthy that the physicians in the 18th-century Russian service, who analyzed medical phenomena of a particular place, conducted similar research to that of early modern naturalists, exploring the regional specifics of the native species in Europe and around the globe.⁶ Indeed, Russian spatial expansion was known for the intensive scientific research of the territories of Siberia, Caucasus, Black Sea Region, etc., which tended to be included in the empire. In the foreground of the research were mostly university-educated *doctores medicinae*, invited to serve as *naturalists* in the Academy of Sciences, and who made a number of expeditions through the empire. Their task was

- 1 J.T. Alexander, *Catherine the Great and Public Health*, "Journal of the History of Medicine and Allied Sciences" vol. 36, 1981, no 2, p. 185–204; E. Amburger, *Beiträge zur Geschichte der deutsch-russischen kulturellen Beziehungen*, Gießen 1961, p. 30–39.
- 2 A. Renner, *Progress through Power? Medical Practitioners in Eighteenth century Russia as an Imperial Elite*, "Acta Slavica Iaponica" 2009, no 27, p. 29–54; idem, *Russische Autokratie und Europäische Medizin. Organisierter Wissenstransfer im 18. Jahrhundert*, Stuttgart 2008; D. Sambuk, *Wächter der Gesundheit: Staat und lokale Gesellschaften beim Aufbau des Medizinalwesens im Russischen Reich 1762–1831*, Köln 2015; E.A. Vishlenkova, *Mediko-biologicheskije obyasneniya social'nyh problem Rossii (vtoraya tret' XIX veka)*, [in:] *Istoriya i istoricheskaya pamyat'*, ed. by A.V. Gladyshev, vol. 4, Saratov 2011, p. 37–66.
- 3 A. Rankin, *How to Cure the Golden Vein: Medical Remedies as Wissenschaft in Early Modern Germany*, [in:] *Ways of Making and Knowing: The Material Culture of Empirical Knowledge*, ed. by P.H. Smith, A.R.W. Meyers, H.J. Cook, Ann Arbor 2014, p. 113–137.
- 4 G. Pomata, *The Observations in Early Modern Medicine*, "Early Science and Medicine" vol. 15, 2010, no 3, p. 193–236.
- 5 A. Renner, *Wissenschaftstransfer ins Zarenreich des 18. Jahrhunderts. Bemerkungen zum Forschungsstand am Beispiel der Medizingeschichte*, "Jahrbücher für Geschichte Osteuropas" vol. 53, 2005, no 1, p. 64–85.
- 6 A. Cooper, *Inventing the Indigenous. Local Knowledge and Natural History in Early Modern Europe*, Cambridge 2007.

no less than to describe and categorise all the natural and human resources of the newly born empire, in accordance with both institutional questionnaires and the intellectual culture of the Enlightenment, as among the readers of the accounts were not only representatives of *Respublica Literaria*, but, more importantly, state authorities.⁷ Apart from the naturalists, also learned foreign physicians, with the same educational background, were able to explore non-developed and outlying districts of the Russian Empire, as well as to obtain the information about their natural resources.

Not meaning to give an exhaustive explanation of the problem how learned physicians produced knowledge about medical and natural phenomena in the 18th-century Russian Empire, the present paper attempts at a case study of oil exploration in the Baku region, carried out by a Prussian physician in Russian service, Johann Jacob Lerche (1708–1780). His substantial written legacy, surprisingly just scarcely used in the historical scholarship, contains several descriptions of his investigations, and enables us to follow the physician's research practices and the ways of production and communication of knowledge. While performing his professional duties in the Pre-Caspian region, as in many other remote regions of the empire and near its unstable borders, Lerche observed a lot of *naturalia*, which not always, but frequently were seen as possible medicines. Among the most intriguing natural phenomena were the gas and oil of Baku and the surrounding area, which were believed to have certain medical qualities. The article aims to reveal the methods of medical investigation of a natural phenomenon, and of the region overall, through a thorough analysis of Lerche's published works on this subject, namely his quasi-auto-biographical book *Rußisch-kaiserlichen Collegienraths, und Doctors der Arzeneywissenschaft, Lebens- und Reise-Geschichte [...] (History of Life and Travels [...])*,⁸ the article on the mineral wonders of the Baku region,⁹ and the official recommendation on how to prevent plague contamination.¹⁰ First, the study discusses the knowledge about oil in early modern Europe and Russia. After an overview of Lerche's biography and his written legacy used in the present study, the following parts offer a detailed investigation of the three perspectives on petroleum, revealed from its descriptions by Lerche: as an Eastern wonder, a mineral, and, finally, a medicine. The knowledge about petroleum is presented

- 7 Y. Slezkine, *Naturalists Versus Nations: Eighteenth-Century Russian Scholars Confront Ethnic Diversity*, "Representations" 1994, no 47, p. 170–195; H.F. Vermeulen, *Before Boas: The Genesis of Ethnography and Ethnology in the German Enlightenment*, Lincoln 2015. About medical descriptions of the Russian Empire see Z. Gatina, E. Vishlenkova, «Izlozhit' predmet scientificheski»: *russkije vrachi i ikh polevye issledovanija (pervaja polovina XIX veka)*, "Rossijskaja istorija" 2015, no 3, p. 154–169.
- 8 Johann Jacob Lerche, *Rußisch-kaiserlichen Collegienraths, und Doctors der Arzeneywissenschaft, Lebens- und Reise-Geschichte, von ihm selbst beschrieben, und mit Anmerkungen und Zusätzen herausgegeben von D. Anton Friedrich Büsching*, Halle 1791.
- 9 Siebende Abhandlung. In unterschiedenen minerologischen Observationen bestehend; aus einem Schreiben des Rußischen Keyserl. Feld Medici Herrn D. Lerchens d.d. Astracan, den 2 Julii, 1735. Genommen, "Ober-Sächsische Berg-Academie, in welcher die Bergwercks-Wissenschaften nach ihren Grund-Wahrheiten untersucht, und nach ihrem Zusammenhange entworfen werden" vol. 2, 1746, p. 177–180.
- 10 *Nastavlenie, kakim obrazom predohranjat' sebya ot prilipchivyh boleznej. S prilozheniem mneniya Doktorov k predohraneniyu goroda ot zarazy i primechaniya, uchinennago po semu predmetu Shtats Fizikom Doktorom Lerkhom [An Instruction, how to Prevent Oneself from Pestilences, With Addition of the Physicians' Opinion to the Prevention of the City from the Contagion and the Comment on this Matter, Composed by Stadt-Physicus Doctor Lerche]*, [in:] *Polnoe sobranie zakonov Rossijskoi Imperii*, first series (1649–1825), vol. 19, St. Petersburg 1830, no 13732. This legislation text was also included in the description of these dramatic events, composed by a chief physician of Moscow hospital, Afanasij F. Shafonskij, in 1775: *Opisanie morovoi jazvy, byvshei v Moskve s 1770 po 1772 god*, Moscow 1775.

as a result of the appropriation of, 1) first-hand observations of and experiments with the object, and 2) the interpretation of local practices according to the conceptual frames from the mineralogical and medical theories, but also influenced by Lerche's official position as a state physician.

Petroleum as an object of inquiry in the 18th century

Binding industry and international relations,¹¹ petroleum overcomes the boundaries of being only a *natural phenomenon*. Estimated epistemologically, it is more likely to be identified as a *natural resource*, i.e. an object defined through its practical use for humans, and its cultural implementations.¹² The 19th century could be especially highlighted for intensive exploitation of fossil hydrocarbon oil, when technological and transportation means, as well as global market formation, provided the possibilities of extraction, processing, and trade of petroleum as a raw material, used for the production of derivatives. The variety of early supply of yellow-to-black oil was mostly limited to its local use as a *component* or an *alternative* for fuel, lubricant, waterproofing, drawing and building material, and, finally, medicine.¹³ Despite the discovery of crude oil deposits within the borders of the European states as early as in the 16th century, it is only in the Age of Enlightenment that one can speak of the 'rediscovery' of petroleum.¹⁴ Along with all natural objects, namely plants, animals, and minerals, it should be identified and placed within a classificatory system.¹⁵ Early modern physicians and various natural researchers, teachers, and even canons attempted to learn something about the complicated substance in person, and composed works on both petroleum's nature and use, and presented them wherever it was *locally* possible and appropriate. From this perspective, the knowledge about petroleum as a *naturale* remained mostly connected with the initiatives of local agents and institutes, which had an opportunity to learn about it on situ.¹⁶

In the 18th century, one of today's top crude oil producers, Russia, knew about a relatively small number of petroleum deposits, and the published evidence devoted to the study of petroleum was also scarce, and produced mostly by miners and learned men.¹⁷ Nevertheless, the search for and the research of petroleum deposits and its qualities intensified, in terms of general mineralogical activities, thanks to the efforts of Peter the

11 W. Beinart, L. Hughes, *Environment and Empire*, New York 2007, p. 251.

12 G. Bankoff, P. Boomgaard, *Introduction: Natural Resources*, [in:] *A History of Natural Resources in Asia: The Wealth of Nature*, ed. by G. Bankoff, P. Boomgaard, New York 2007, p. 1–17.

13 R.J. Forbes, *Bitumen and Petroleum in Antiquity*, Leiden 1936; idem, *Studies in Early Petroleum History*, Leiden 1958; S.H. Longrigg, *Oil in the Middle East*, London 1968, p. 10–11; M.S. Vassiliou, *Historical Dictionary of the Petroleum Industry*, Lanham 2018, p. 3.

14 R.J. Forbes, *Studies in Early Petroleum History*, p. viii–xi.

15 S. Gibson, *Animal, Vegetable, Mineral? How Eighteenth-Century Science Disrupted the Natural Order*, New York 2015.

16 R.J. Forbes, *Studies in Early Petroleum History*; D.N. Livingstone, *Putting Science in Its Place: Geographies of Scientific Knowledge*, Chicago 2003.

17 A.A. Matveichuk, I.G. Fuks, *Istoki rossijskoj nefti: Istoricheskie ocherki*, Moscow 2008; M.Y. Mir-Babayev, *Kratkaya istoriya azerbajdzhanskoj nefti*, Baku 2009, p. 9–34; A.K. Troshin, *Istoriya neftyanoj tekhniki v Rossii (XVII – vtoraya polovina XIX v.)*, Moscow 1958; I.Ya. Zaripov, *Ot skvazhiny do benzokolonki: Istoricheskie ocherki neftyanoj otrasli Rossii*, Moscow 2016, p. 6–15.

Great and *Berg-kollegia* (the Collegium of Mining).¹⁸ There were actually two places with oil sources, well-known since the early modern period. The most attractive and famous one was an area in the North, in the surroundings of the Ukhta river, whose remote location was an obstacle for its serious development. From the perspective of the benefits for Central Russia, whose forest area did not need alternative fuel, it was an expensive and unnecessary undertaking. For this reason, large-scale exploitation of these deposits in 1745 by Fyodor Pryadunov was cancelled.¹⁹

Alternatively, crude oil was imported from Baku, the place whose wonderful natural phenomena, especially ‘eternally-burning’ fires, originating from natural gas seepages, already attracted the attention of medieval travelers from the West and East. Since 1501, the city was under the control of the Safavid dynasty, so its oil was initially considered as *foreign* by native Moscovites.²⁰ However, after a short-term conquest of the region by the troops of Peter the Great in 1723, the town was eventually included in the empire for about 12 years. Thereafter, from the perspective of Russian authorities, it was one of the most significant locations in the Caucasus, a natural mountainous border of the plane region of Inner Eurasia,²¹ inaccessible and perfectly suitable for the colonial enterprises of marine empires. Therefore, the natural wonders of the whole region became an object of a Russian imperial inquiry.²² For centuries, the Caspian Sea was perceived as a border between the West and East by European travelers and thinkers.²³ Its people (Tatars, Persians, Indians), warm climate, specific diseases, and natural objects were considered local features. In this sense, the natural wonders of Baku became a tool for learning about Russia as the *other* from the outside and as a mosaic of different people from an internal view on the empire.²⁴

Lerche’s travels and accounts

Among other learned men who travelled and observed the 18th-century Russian Empire was Johann Jacob Lerche, who was known from the variety of professional occupations, locations visited during his long stay in Russia, and particularly from his excellent previous written work reflecting his intensive research activity. As many young scholars at the time, he was employed by the Russian Medical Chancellery just a year after he had graduated from the University of Halle in 1731, and he did not leave Russian service until his death. As a physician, he accompanied Russian military troops and diplomatic embassy,

18 *Berg-kollegia* (in Russian) or ‘the Collegium of Mining’ was the Russian state institute, established in 1719, which was responsible for the research and development of mineral resources.

19 A.A. Korshak, *Pervyj neftyanoj promysel Rossii (k 270-letiyu osnovaniya)*, “Elektronnyj nauchnyj zhurnal «Nefte-gazovoe delo»” 2016, no 3, p. 119–136, DOI 10.17122/ogbus-2016-3-119-136; A.A. Matveichuk, I.G. Fuks, op. cit., p. 73–82; I.Ya. Zaripov, op. cit., p. 6–15.

20 I.Ya. Zaripov, op. cit., p. 12.

21 D. Christian, *A History of Russia, Central Asia and Mongolia*, vol. 2, New York 2018, p. 213.

22 A.A. Matveichuk, I.G. Fuks, op. cit., p. 171–173.

23 C. Volpilhac-Augier, *Soedinyat’ pustyni s pustyniyami? Kaspijskoe more glazami francuzov XVIII v.*, [in:] *Evropejskoe Prosveshchenie i civilizaciya Rossii*, ed. by S.Ja. Karp, S.A. Mezin, Moscow 2004, p. 42–64.

24 About the change in the European perception on Russia after its ‘opening’ in the 18th century, see I.B. Neumann, *Uses of the Other: ‘The East’ in European Identity Formation*, Minneapolis 1999; L. Wolff, *Inventing Eastern Europe: The Map of Civilization on the Mind of the Enlightenment*, Stanford 1994.

fought epidemics, served as a *Stadtphysicus* (city physician), and, for three years, was the governor of the entire medical department. These activities meant that Lerche travelled extensively. He visited the Caucasus and Low Volga region twice, as well as, Sloboda and Western Ukraine,²⁵ Northern Black Sea Region, Finland, Moldova, and Walachia. Indeed, it was the exercise of daily records, practiced by Lerche over his lifetime, which allowed him to determine the particularities of regional physical landscapes and the everyday life of the locals.²⁶ Furthermore, these manuscripts served the physician as a source to produce various papers for personal use, for scientific institutions, and for the Russian government.²⁷ Indeed, Lerche's personality and works were explored only fragmentarily. In the existing literature, the most substantial work on his written legacy was written for the purposes of the reconstruction of regional history (Low Volga and Northern Azov regions in particular); recently, Lerche has also attracted the attention of the researchers into 18th-century Russian medicine and cultural contacts.²⁸

The topics of Lerche's descriptions varied but were connected with one another, and uniquely linked to the Caspian-Persian region: its plants, peoples, weather, diseases, and, finally, to his journeys. The only engravings published with Lerche's works were the illustrations of the Pre-Caspian phenomena. Lerche visited the region twice, in 1732–1735 and 1745–1747, both as the main physician, accompanying imperial enterprises; the first was a military campaign, and the latter a diplomatic delegation of Prince Mikhail Mikhailovich Golitsyn (1684–1764). Gas and oil phenomena were the only two local curiosities which attracted Lerche's attention as a naturalist, however, as a state physician,

- 25 *Sloboda Ukraine* or *Slobozhanshchyna* is a historical region, formed in the 17th–18th centuries, which includes territories of today's northeastern Ukraine and southwestern Russia.
- 26 Two copies of Lerche's journals are preserved today in two holdings at St. Petersburg: Otdel rukopisej Rossijskoj nacional'noj biblioteki, St. Petersburg [OR RNB], coll. 431, *Lerkhe I.Ya., 1727–1776*, file 1–10; Sankt Peterburgskij filial arkhiva Rossijskoj akademii nauk, St. Petersburg [SPbF ARAN], division III, *Rukopisi trudov i otdel'nye dokumenty, postupivshie v rkhiv kademii nauk iz Kabineta inkunabulov Biblioteki kademii nauk v 1931 g.*, descr. 1, file 334–336.
- 27 *Anmerkungen über Herrn D-r Schobers Memorabilia Russico-Asiatica zu Anfange dieses Bandes von Herrn Hofrath Lerche*, "Sammlung Russischer Geschichte" vol. 17, 1763, p. 531–546; *Auszug aus dem Tagebuch von einer Reise, welche D. Johann-Jacob Lerch von 1733 bis 1735 aus Moscau nach Astrachan und in die auf der Westseite des Caspischen Sees belegene Länder gethan hat*, "Magazin für die neue Historie und Geographie, angelegt von D. A.-F. Büsching" vol. 3, 1769, p. 1–44; *Descriptio plantarum quarundam partim minus cognitatarum astrachanensium et Persiae provinciarum Caspio mari adiacentium iuxta methodum sexualem excellentissimi domini archiatri Caroli de Linne. Accedit plantarum catalogus istarum regionum cum variis observationibus Io. Iac. Lerche*, "Acta Physico-Medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum" vol. 5, "Appendix ad Tomum Quintum Novorum Actorum Medico-Physicorum Academiae Caesariae Leopoldino-Carolinae Naturae Curiosorum in Germania" 1773, p. 161–206; *Eine kurze Beschreibung von der Lebensart der Wolgaschen Kalmücken*, "Sammlung Rußischer Geschichte" vol. 4, 1760, p. 360–364; *Extrait des observations météorologiques de Mr. le Dr. Lerch faites à Astracan pendant l'hyver de 1745. à 1746. et l'été suivant*, "Histoire de l'Académie Royale des Sciences et des Belles Lettres année MDCCXLVI", 1748, p. 257–264; *Nachricht von der zweiten Reise nach Persien, welche der kaiserl. Russische Collegienrath Herr D. Johann-Jacob Lerch von 1745 bis 1747 gethan hat. Ausgefertigt 1765*, "Magazin für die neue Historie und Geographie, angelegt von D. A.-F. Büsching" vol. 10, 1776, p. 367–476; *Polnoe sobranie zakonov*, no 13732; *Siebende Abhandlung*, p. 177–180.
- 28 E.g.: M. Dinges, *Kann man medizinische Aufklärung importieren? Kulturelle Probleme im Umfeld deutscher Ärzte in Rußland in der zweiten Hälfte des 18. Jahrhunderts*, [in:] *Migration nach Ost- und Südosteuropa vom 18. bis zum Beginn des 19. Jahrhunderts. Ursachen, Formen, Verlauf, Ergebnis*, Stuttgart 1999, p. 209–234; idem, *Nemeckije vraci v Rossii vtoroj poloviny XVIII v.: konflikt kultur*, [in:] *Russkije i nem y v XVIII veke: vstrecha kultur*, Moscow 2000, p. 160–189; A.L. Kleitman, R.L. Kovalevsky, G.K. Savchenko, *The Low Volga Region and Territory of the Don Cossacks in the Unpublished Fragment of Memories by Doctor J.J. Lerche (1749)*, "Russkij archiv" 2015, no 4, p. 278–287.

he marked out specific qualities of petroleum derived from the wells surrounding Baku, which protected, as he believed, Baku inhabitants from plague contamination. However, the information about petroleum itself is quite scarce and scattered in Lerche's texts. The manuscripts reveal only passing notes about the oil deposits and a small note with the analysis of the substances found in other burning materials.²⁹ At this time, he had two papers on petroleum, though short, published. One is the article in the journal 'Ober-Sächsische Berg-Academie,' in the edition by a Prussian miner, Carl Friedrich Zimmermann (1713–1747).³⁰ Composed soon after his first trip to the Caucasus, but published nearly a decade later, around 1746, just after Lerche's second voyage to the Caucasus, this paper gives a four-page account on mineralogical phenomena of the Baku region. The second document is an official instruction with measures to prevent the population of Moscow and the surrounding area from the pestilence which exploded in 1771, and it includes a small remark on petroleum use for medical purposes.³¹

In addition, a detailed account on petroleum can be found in Lerche's book *Lebens- und Reise-Geschichte*.³² It is still his most remembered work. Despite resembling an autobiographical narrative about Lerche's life and travels, it is an elaborated version of the fragments from Lerche's diaries, which he composed about 1765, expanded in 1769 and 1772,³³ and which came out only 11 years after Lerche's death, in 1791, in Halle. They were edited by a Prussian theologian and educator, Anton Friedrich Büsching (1724–1793), who apparently organised Lerche's accounts in a comprehensive narrative story, as its structure and chapter division are very similar to Büsching's other books. Whether and to what extent Büsching and/or Lerche himself corrected the story's content, remains uncertain. Although Lerche's diaries and letters bear marks of his intensive work on the preparation of the accounts to be published by Büsching, no final manuscripts were found.³⁴ Regardless, among all the texts indicated above, *Lebens- und Reise-Geschichte* stands out with its likeness to the original material, i.e. Lerche's diaries. However, contrary to the manuscript material, the book contains coherent arguments on plants, animals and weather conditions, natural and artificial objects, especially wonderful phenomena, and it presents the author's attempt to consider and explain their structure and functions in retrospect of his travels. Specifically in these accounts, a reader meets intriguing fragments on how petroleum interacts with other natural substances, and how beneficial it is in everyday life of indigenous people.

29 OR RNB, coll. 431, file 3, f. 258v; file 4, f. 63v, 64v, 66v.

30 *Siebende Abhandlung*, p. 177–180.

31 *Polnoe sobranie zakonov*, no 13732.

32 *Johann Jacob Lerche*.

33 OR RNB, coll. 431, file 5, f. 4–5v; file 10, f. 59v–60v, 180v–181.

34 There are also well-known two extracts of the book, concerned with the Caucasus journeys, which were published by Büsching earlier and separately in his magazines, see *Auszug aus dem Tagebuch*, p. 1–44; *Nachricht von der zweiten Reise*, p. 367–476. Exactly these two texts were later translated into Russian, see *Izvestie o vtorom puteshestvii doktora i kollezhskago Sovetnika Lercha v Persiyu, ot 1745 do 1747 goda*, "Novye ezhemesyachnye sochinieniya" 1790, no 48, 50, 52, 53, 54, p. 52–102, 44–96, 44–66, 20–47, 73–95, 1791, no 55, 56, 57, 58, 60, 61, 62, p. 55–79, 77–93, 87–99, 63–82, 82–90, 67–79, 58–83; *Vypiska iz puteshestviya Ioanna Lerkha, prodolzhashegosya ot 1733 po 1735 god iz Moskvyy do Astrahani, a ottuda po stranam lezhashchim na zapadnom beregu Kaspijskogo morya*, "Novye ezhemesyachnye sochinieniya" 1790, no 43–45, p. 3–53, 69–97, 66–97.

An Eastern wonder

The Pre-Caspian region was the first of Lerche's destinations after he had arrived in Russia, as he was appointed a physician of Russian military troops and nobility during the campaign in 1733–1735. Having been previously engaged in other military activities in the South and in the North of the Russian Empire, where he fought plague epidemics, he was obliged to visit the Caspian region to escort the diplomatic delegation of Prince Mikhail Mikhailovich Golitsyn in 1745–1747. At that time, Lerche was also given a special task from the Academy of Sciences, i.e. to make observations following the instructions on how to describe various peoples, previously composed by Gerhard Friedrich Müller, and to guide the academic, Johann Eberhard Fischer, in his expedition through Siberia, in 1739. The instructions were adapted for Lerche who was to include evidence about the history, geography, and politics of Persia.³⁵ Lerche's guidelines are only mentioned in the proceedings of the Academy, while Fischer's were published in 1900. They were famous for an enormous number of questions, 923, which had to be observed while describing the peoples of Siberia. The documents also included the recommendations on making maps, collecting objects for *Kunstkammer* in St. Petersburg, and recording languages and dialects.³⁶ Indeed, the questionnaires of this type were part of the research, deemed to be early ethnographical in nature, as they attempted to overview in detail the peoples of the newly accessed territories.³⁷

An overview of Lerche's works shows that the Pre-Caucasian Russian borderlands and Persian territories gave him the most intriguing material, appropriate to be shared with the representatives of the Enlightenment and intellectual circles. Not only the Russian medical department but also Carl Linnaeus received the specification of Astrakhan and Persian plants,³⁸ which was expanded and published in Latin in 'Novo acta physico-medica,' by the German Academy of Sciences, *Leopoldina*.³⁹ The Academy of Sciences in St. Petersburg was also interested in Lerche as a learned traveler, who could provide the data on little-known lands and peoples. It was again Gerhard Friedrich Müller who published Lerche's account on the Kalmyks and some remarks on one earlier description of the Pre-Caspian region, made by another German physician in Russian service, Gottlob Schober (1670–1739).⁴⁰ As for the publications by Büsching, who edited several biographical compendia and historical and geographical accounts, they were extremely popular among the educated public. In this context, Lerche's papers are seen more as travelogues about eastern territories and peoples. The validity of this view could be supported by the fact that the editor himself expressed high interest in studying little-known Russia and its borderlands. Moreover, the place of his (and Lerche's) study and later work was Halle, an early centre

35 *Letopis' Rossijskoj Akademii nauk* vol. 1, St. Petersburg 2000, p. 308.

36 G.F. Müller, *Instruktion G.F. Müller's für den Akademiker-Adjuncten J.E. Fischer. Unterricht, was bey Beschreibung der Völker, absonderlich der Sibirischen in acht zu nehmen*, [in:] *Sbornik Muzeja po antropologii i etnografii*, 1900, vol. 1, p. 37–99.

37 H.F. Vermeulen, op. cit., p. 164–183.

38 *Descriptio plantarum*, p. 161–206.

39 The Linnean Collections, London, *Linnaean correspondence, from Lerche, Johann Jacob to Linnaeus, Carl* (5 November 1764 – 11 April 1774), L3480, L3783, L3783, L4055, L4188, L4329, L4363, L4688, L4823, L4981; The Linnean Collections, London, *Linnaeus' manuscripts, 16 November 1764*, GB-110/LM/MA/LER/1; The Linnean Collections, London, *Linnaeus' manuscripts, 18 July 1766*, GB-110/LM/MA/LER/2.

40 *Anmerkungen über Herrn D-r Schobers Memorabilia*, p. 531–546; *Eine kurze Beschreibung*, p. 360–364.

of learning about Russia, thanks to the 18th-century missionary and educatory activities of pietists.⁴¹

Lerche's familiarity with the accounts on the Pre-Caspian region can be judged from his references to only two of his predecessors when he mentions some other natural objects of the Caucasus region. These predecessors were famous 17th-century European travelers, namely Adam Olearius (1599–1671) and Engelbert Kaempfer (1651–1716). As Lerche in the 1740s, they both participated in European expeditions to Persia and left detailed accounts of their journeys. Their texts contained more or less detailed descriptions of crude oil deposits; this is why these authors are still frequently included in the lists of key figures in the history of petroleum development.⁴² Kaempfer's travelogue primarily depicted the phenomena of the Absheron peninsula as local wonders. However, Lerche's publications do not reveal that those earlier accounts were taken into consideration while studying oil and gas fields. Here the physician's personal experience is presented as the only source of valid information. This representation of Lerche as a discoverer of a place was frequently underlined in his text, along with the remarks on the observations he had made. For example, a special visit to explore mineral wonders justified the continuation of the trip through the Absheron peninsula, while accompanying one of the Russian military nobles:

However, I was not satisfied with the short stay by the eternal fire, petroleum wells, and other wonderful places, so I went there back again on the 19th of July with two Cossacks and my two servants to observe everything more accurately.⁴³

One of the engravings from the book *Lebens- und Reise-Geschichte* can serve as a visual account, namely the map of the Shirvan and Dagestan provinces, including the Absheron peninsula.⁴⁴ In addition to toponyms, there could be distinguished some local wonders, which could be better attributed to the field of earth studies: eternally-burning fires (*Ewiges Feuer*), rising hills (*Wachsende Berge*), a fire-spewing mountain (*Feuerspeiender Berg*), and, finally, petroleum (*Naphta*) (see Fig. 1). The wonders depicted on the map seem to have been not only impressive objects, but they also proved the originality of the place. From this point of view, *naturalia* about which Lerche also communicated in his travelogues could be seen as something more than only a contribution to the project of scientific classification, in which Lerche participated as one of Linnaeus' correspondents.⁴⁵ They were also one of the most valuable characteristics of the place and its inhabitants.

41 E. Winter, *Halle als Ausgangspunkt der deutschen Russlandkunde im 18. Jahrhundert*, Berlin 1953; H.F. Vermeulen, op. cit., p. 103–108.

42 E. Kaempfero, *Amoenitatum Exoticarum Politico-Physico-Medicarum, Fasciculi V: Quibus continentur Variae Relationes, Observationes & Descriptiones Rerum Persicarum et Ulterioris Asiae multa attentione, in peregrinationibus per universum Orientem, collectae*, Lemgoviae 1712, p. 274–279; A. Olearius, *Vermehrte Neue Beschreibung Der Muscovitischen und Persischen Reyse, So durch gelegenheit einer Holsteinischen Gesandtschaft an den Russischen Zaar und König in Persien geschehen. Worinnen die gelegenheit derer Orte und Länder, durch welche die Reyse gangen, als Liffland, Rußland, Tartarien, Meden und Persien, sampt dero Einwohner Natur, Leben, Sitten, Hauß- Welt- und Geistlichen Stand mit fleiß aufgezeichnet, und mit vielen meist nach dem Leben gestellten Figuren gezieret, zu befinden*, Schlebwig 1656, p. 459.

43 Johann Jacob Lerche, p. 59.

44 Actually, this engraving was published also earlier in the third volume of Büsching's 'Magazin für die neue Historie und Geographie', in 1769, as an illustration to Lerche's account on his first travel to the Caucasus.

45 About the international network of travelled correspondents, which provided Linnaeus with the information about local flora, see: M.L. Pratt, *Imperial Eyes: Travel Writing and Transculturation*, London 1992.

A mineral

All of the wonders mentioned above belonged to the earth studies of the time. More precisely, minerals were considered as the objects of one of nature's realms, together with plants and animals. In addition, minerals remained a fundamental category in the early modern theories of the Earth's history, which developed substantially since the review of the Aristotelian physics in the 16–17th centuries. The 18th-century mining undertakings, together with the excavation of new mineral objects, intensified methodological discussions and provoked an urgent need for the data on mineral deposits, fossils, soils, and landscapes.⁵⁰

As a student of a medical faculty who graduated with the thesis on regional fossils and minerals of Halle, Lerche appears to have been familiar with the ongoing debates in the field. However, the physician did not attempt to construct any specific mineralogical portrait of the region, as he did in the case of the Astrakhan and Persian plants. This time, Lerche's observation of the local flora was presented together with the material collection of some specimens and, more importantly, there was an attempt to name the botanical samples following the classificatory method of Linnaeus. As a matter of fact, the Swedish naturalist also attempted to elaborate on the principles in order to make them adequate for the classification of minerals. In a simple explanation, salts (as male entities) and soils (as female entities) were presumed to be basic elements, combinations of which formed various kinds of minerals. However, a botanical model, based on the classification of objects according to key general characteristics, worked well for plant and animal classification, but not for minerals. The rejection of this classificatory principle would mean ongoing discussions. The reaction included, for example, the identification of minerals by their external characteristics, and recognising specimens with the same properties.⁵¹

Lerche's contribution to contemporary mineral research was also much limited, as a result of his attempts to understand the composition of substances and to state interrelations between various phenomena. His hypotheses about the physical properties of petroleum were primarily based on his regular observations during both journeys. Although Lerche did not place oil within any group of minerals, he made assumptions and statements about it in his descriptions of Baku and Absheron. First of all, the examination of the physical landscape of the petroleum wells location let the physician notice the salinity of the soil, plants, and water in the Baku area, as well as the proximity of petroleum wells to salt lakes and swamps. As a consequence, Lerche concluded that 'petroleum and salt have a particular commonness.'⁵² Hence, petroleum should be qualified in a similar way, which means it should be described with *salinity* too. The second type of observed characteristics was related to the *combustibility* of petroleum, which was observed in the intentional influence on petroleum when the locals used oil in their everyday activities as a fuel. For example, the indigenous way of food preparation allowed Lerche to make remarks about the smoke and smell, the end products of petroleum, which came to be the key indicators of the character of similar phenomena, namely of two sorts of petroleum

50 R. Laudan, *From Mineralogy to Geology: The Foundation of a Science, 1650–1830*, Chicago 1987, p. 47–65.

51 About the discussion see R. Laudan, *op. cit.*, p. 70–86.

52 *Johann Jacob Lerche*, p. 42.

(black/white) and natural gas. The location of crude oil wells nearby made the physician also consider whether all these phenomena were connected or not:

I come back to the fire. It has a wonderful effect, and I do not doubt that it should not have sustained nourishment from petroleum, which springs here nearby and is located in the district far around. It is, however, considered that there is a big difference between the fire from white petroleum and the one from the black, which gives a deep black smoke, and musty smell when it is burnt; on the contrary, neither smoke nor smell could be noticed around the eternal fire.⁵³

Nevertheless, it was observed that the processes of the distillation of both dark-brown and light crude oil with fire resulted in the production of odour and black smoke, which was associated with that of petroleum in general, although their color was different both before and after the distillation.⁵⁴

The smoke and smell of petroleum were significant characteristics of its use as fuel, lubricant, and light source in everyday life. In this perspective, the accounts on crude oil relate primarily to the life of local residents. Lerche described in detail how petroleum was used instead of wood and tar, which were utilized by both Europeans and Russians but not on the Caspian shores.⁵⁵ These profits of yellow-to-black liquid were emphasized in the publication on the mineral wonders of Baku, which came out in the volume of the 'Ober-Sächsische Berg-Academie'.⁵⁶ The article focused on the description of three geological curiosities of the Caucasus region: petroleum, burning soil, and rising hills. The paper had a brief introduction, written presumably by Carl Friedrich Zimmermann himself, which marked the potential usefulness of this report in the discussions on mineralogy. But as a person who held a prominent position in the field of mining, he turned the reader's attention to a more practical benefit of Lerche's report: it could help in the research of similar resources in 'our own' (more likely Saxon) lands – for instance, of bituminous coal.⁵⁷

This consideration of petroleum as a substance equivalent to coal, which was already used and excavated from European deposits, was spread in the early modern period and thereafter.⁵⁸ This primary attribution of petroleum to the state economy echoes in the very description in this account. In contrast to a more detailed and non-structured text of *Lebens- und Reise-Geschichte*, this time Lerche does not define petroleum in terms of its qualities as a physical *object*, but rather as an economic *resource*; only as a fuel. In this case, Lerche demonstrated more possibilities of oil consumption, regarding petroleum as a *beneficial* natural phenomenon. Its only characteristics related to the price and the ways it could be used, regardless of the fact that the smoke belching from the burning of this fuel made the houses black on the inside.

The physician himself remained on the stage of assumptions, relying on personal observations and local knowledge. However, when he conveyed the information about the

53 Ibid., p. 61.

54 Ibid., p. 66.

55 Ibid., p. 41, 44, 45, 61, 62, 66.

56 *Siebende Abhandlung*, p. 177–180.

57 Ibid., p. 177.

58 R.J. Forbes, *Studies in Early Petroleum History*.

practical benefits of petroleum, Lerche continued to address the procedures of scientific research of earth phenomena. These procedures assumed a 'common sense' approach of mineralogists; despite the theoretical diversity, four basic classes of minerals were presumed to constitute the surface of the Earth: soils, metals, salts, and bituminous substances. Certain observations could be made by merely recording the reactions of objects with fire and water, in order to identify a mineral and to establish its correlation with a particular class.⁵⁹ In Lerche's case, the observation of petroleum's location near salt substances seems to have been the key argument for the presentation of petroleum not just as a natural *object*, but as a significant *resource* as well.

A medicine

Although no final definition of petroleum as a mineral substance was then formed in Lerche's text, its physical characteristics, marked out in the course of the observations, gave Lerche the possibility to argue for its properties and to further interpret local practices of its use. More precisely, these properties were salinity and combustibility of petroleum, on which the assumptions of its medical qualities were based. By the time it was an obvious step (as the chemical tradition of treatment continued to develop from earlier iatrochemical beliefs); minerals were still considered as substances which acted on the human body. Ancient and medieval physicians (both from within and outside of Europe) were well-acquainted with petroleum use in various treatment practices: against scabies and itching; for reptile bites; for pain in the sides and as an anticoagulant, etc.⁶⁰

Lerche at first found petroleum useful in fighting the plague – the most devastating disease for almost all Russian military activities, as well as for the ordinary population throughout the 18th century. In early modern Europe, *plague* was a name frequently applied to any epidemic, i.e. a disease which spread sporadically among all the population of a given area in a short period of time. In those days, it was considered a *paradoxical* disease, which could not be explained, either with the help of the ancient classics of medical thought or the practical experience of the time. These circumstances made the physicians interpret the enduring theories freely, in correspondence with their own observations; consequently, they were also free to construct new explanatory models concerned with the nature and causes of the disease and the remedies for its treatment.⁶¹

One theory, however, was prevailing in Europe until the bacteriological revolution in the middle of the 19th century. It was based on the idea that an epidemic is caused by 'bad air' (or *miasma*, from Greek *pollution*), which is *corrupted* either through the decaying of organic substances (animal and human corpse, vegetable matters), or the exhalations from stagnant or poisoned waters. In addition, both environmental and cosmic phenom-

59 R. Laudan, op. cit., p. 21–28.

60 R.J. Forbes, *Studies in Early Petroleum History*; G. McDonald, *Georgius Agricola and the Invention of Petroleum*, "Bibliothèque d'Humanisme et Renaissance" vol. 73, 2011, no 2, p. 351–363.

61 A. Steczowicz, *Paradoxical Diseases in the Late Renaissance: The Cases of Syphilis and Plague*, [in:] *Framing and Imagining Disease in Cultural History*, ed. by G.S. Rousseau, M. Gill, D. Haycock, M. Herwig, New York 2003, p. 269–284.

ena were frequently considered as influencing the origin or the spread of the pestilence.⁶² Thus, the primary methods to overcome an epidemic were air fumigation and ventilation, as well as washing clothes and dwellings. In this respect, the ability of *petroleum* to combust and to produce the fume made it similar to substances which can smoke and, thus, decontaminate the poisonous air, such as tar or colophony spirit: 'If it [pest] can originate from the air, so undoubtedly this [air] can be changed and ameliorated through the smoke of the petroleum, which is burnt here every day in all the houses, instead of wood.'⁶³

Lerche reached this conclusion when he was composing the official recommendation on how to protect oneself from the plague, relating to the outbreak of the epidemics in Russia, in 1771, and primarily dedicated to the inhabitants of Moscow and its surroundings. However, the document presents petroleum as a product of luxury consumption. The physician recommended to burn it only to a limited group of men who had a chance to get it.⁶⁴ Lerche's observation on the particular connection of petroleum with salt could also explain its anti-contagious properties. Salt was a well-known remedy used for disinfection, applied by soaking things in water. Lerche practised this method himself in the areas with other climatic conditions: he mentioned it during the massive plague explosion in Moscow and Kiev in the early 70s, so 20 years after Lerche's second journey to Caucasus.⁶⁵

The second use of petroleum, an infusion, was quite unusual. The idea of an internal application of crude oil seems to have been inspired directly by the locals. As Lerche notes:

It is also not harmful to use petroleum on oneself: additionally, it is used for scurvy and limb pains; after all, I saw different people drink [petroleum], especially white, against calculus and limb pains, *item in Gonorrh. calculo, pector. angustia etc.*, and after that found themselves feeling better.⁶⁶

As the physician further remarked, this interpretation of petroleum's healing qualities – as a remedy for kidney stones and rheumatological pains – was based on the analogy with a European practice of drinking a glass of wine in similar cases.

However, the local specifics of petroleum pointed to the limitations of its suitability for foreigners. Lerche stated that petroleum could be beneficial for the inhabitants with endemic skin disease, to which the visitors were mostly exposed. The cause lay not only in the hostile local climate (a fairly popular argument, in accordance with the early ideas on medical geography), but also in being unaccustomed to the internal consumption of petroleum. Lerche proposed two hypotheses for the disease. First, the fact that the disease exploded in the summer indicated heat as its primary cause. However, if this were true, such a beneficial resource as crude oil would contribute to spreading of the disease inside the body: 'Petroleum, which one drinks in Baku every day with water, is a hot substance

62 M. Lindemann, *Medicine and Society in Early Modern Europe*, Cambridge 2010.

63 Johann Jacob Lerche, p. 44.

64 'Whoever is able to can burn petroleum twice a in a small cap'. See *Polnoe sobranie zakonov*, no 13732.

65 *Polnoe sobranie zakonov*, no 13732; Johann Jacob Lerche, p. 445.

66 Johann Jacob Lerche, p. 44–45.

and thus can also carry the rash with it until the man gets accustomed to it [petroleum] and to the climate.⁶⁷

The second possible explanation was supported by Lerche who noticed that the skin disease followed when the body had contact with local insects. Surprisingly, here Lerche changed his own line of argumentation. If, as argued previously, the correlation of disease and heat meant that the people of all ages were exposed to the disease, linking the contagion with the insects led him to the conclusion that the elderly inhabitants were free from the rash. Therefore, the main cause of the sickness turned out to be related to the habits and local circumstances, namely to hot climate and the consumption of crude oil. As a matter of fact, it was not a unique case in Lerche's texts when a group of 'newcomers' to a place appeared to be very different from the natives. However, here it was distinguished on the basis of high contamination risk. Lerche's unhappy personal experience seems to have conditioned this conclusion substantially: he was also contaminated with the abovementioned endemics.

This passage on endemics reveals the contradictions in Lerche's arguments, and thus the difficulties in his attempts to produce new and independent knowledge. Moreover, the confirmation of the habituation to petroleum as a drug provided the possibility for the newcomers to adapt to the local environment. With this knowledge on petroleum, Lerche could characterize Baku from the viewpoint of a state physician. Despite all the negative characteristics of the landscape, which was typical of all the hot Caucasian regions, 'in no other place, of all that Russia has obtained, was the air healthier.'⁶⁸ As the author clarified further on, it was proved by the fact that there were no outbursts of pestilence in the location. As Baku was one of the strategic destinations of the Russian government too, and Lerche was obliged to search for the remedies to stop massive death rates among military men and ordinary people, the petroleum characteristics presented above appeared to have been beneficial, and, more importantly, promising in terms of a potential settlement.

Although the physical qualities of petroleum were allegedly beneficial for human health, the safety of petroleum use raised some doubts, especially in terms of the fumes. In order to disprove this opinion, Lerche organized an experiment. For this he used a chicken, which, as a living creature, was similar to a human body:

It was said that if a man were left in a well on the rope, he would not be able to stay there for a long time without the risk of death. I left a chicken to hang down on the rope for a quarter of an hour, and, when it was unbounded, it sat on the spot as it was dizzy, but soon briskly ran away. Now I do not believe that it [petroleum] should suffocate men. When wells become clogged up, somebody always comes down to clean them. How could it also be possible to dig wells so deep and to brick their walls, if the petroleum mist was so dangerous?⁶⁹

This fragment illustrates the significant role of first-hand experiments and the interpretation of local practices. These two significant ways of collecting and presenting knowl-

67 Ibid., p. 46.

68 'An keinem Orte von allen die Rußland inne gehabt hat, ist die Luft gesunder gewesen. Die Pest hat auch niemals daselbst gewüthet,' *ibid.*, p. 44.

69 Ibid., p. 67.

edge in early modern scientific tradition were somewhat connected to the arguments on the petroleum qualities as a natural drug, which were based on conceptual frameworks already approved within the medical academic community.

Conclusion

Lerche's research on petroleum resulted in no separate publication which would describe its medical or physical characteristics. However, he used petroleum himself, and he recommended it as a valuable economic and medical resource in a scientific report and in an official prescription. Perhaps he knew about Fyodor Pryadunov's attempts to sell petroleum in Moscow. Pryadunov proclaimed its curative effects, and eventually was prohibited from doing so, after the complaints from the injured patients, in 1749.⁷⁰ Indeed, this case demonstrates how early modern traditions of the investigation of natural objects influenced medical research, and also how they continued to be practiced by the professional physicians in the 18th-century Russian service. Moreover, Lerche's research could be seen as a result of the discovering of resources that would be profitable not only for the state economy but primarily for the well-being of the empire that covered the territories with different climates and peoples, such as the Baku region and the European Russia. In that sense, Lerche's texts presented crude oil as a property of the Eastern *other*, which was appropriated with the tools of scientific argumentation by the newcomers from the West.

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Od obiektu naturalnego do zasobu medycznego: Johanna Jacoba Lerchego produkcja wiedzy o ropie naftowej

Ponieważ głównymi zadaniami medycyny rosyjskiej XVIII wieku były wsparcie armii i floty wojennej oraz ochrona imperium przed epidemiami, regularne badania lokalnych zjawisk i zasobów medycznych nie są wyraźnie rozróżnione. W niniejszej pracy podjęto próbę przedstawienia sposobów produkcji i komunikacji wiedzy medycznej na przykładzie poszukiwania ropy naftowej przez pruskiego lekarza w służbie rosyjskiej Johanna Jacoba Lerchego (1708–1780). Chociaż również jego rozległa działalność medyczna w różnych obszarach Imperium Rosyjskiego i rozległa spuścizna piśmiennicza przyciągnęły tylko fragmentaryczną uwagę uczonych, odzwierciedlają one ogromne doświadczenie lekarza w badaniach nad naturą podczas wykonywania jego obowiązków zawodowych. Ropa naftowa była jednym z najbardziej niezwykłych cudów mineralnych w regionie nadkaspjskim, odwiedzanym przez Lerchego dwukrotnie (1732–1735, 1745–1747). Rozważając procesy odkrywania świata w oświeceniu oraz miejscowe praktyki używania ropy, autorka artykułu na podstawie trzech opublikowanych relacji Lerchego, zawierających informacje o jakości ropy naftowej i jej praktycznym przeznaczeniu, bada, w jaki sposób ropa naftowa z Baku jako obiekt naturalny została odkryta jako zasób medyczny przez lekarza państwowego w XVIII-wiecznym Imperium Rosyjskim. Ponadto znaczenie pozycji zawodowej autora jako lekarza państwowego wydaje się mieć wpływ na uzasadnienie leczniczych właściwości ropy naftowej, a ponadto na zalety jej umiejscowienia.