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Hermit Treutler's Jerusalem Balsam

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This paper describes research about a historical bottle found in the Polish town of Skarszewy in 2004. Upon discovery, the find was labeled "In Nazareth Aechter Jerusalemer Balsam im goldnen Engel", sealed and ⅓ filled with liquid. The Jerusalem Balsam mentioned on the label was a popular medicament in Europe in the 18th century. From 1719 it was produced by Father Antonio Menzani da Cuna in the Franciscan Pharmacy at the convent of Saint Savior in Jerusalem. In the 19th century, the Balsam became extremely popular in Silesia thanks to the hermit Johannes Treutler from Mariańska Hill near Kłodzko. It's fame spread north to Prussia and south to Bohemia (Czechia). After the hermit's death, the license for production was obtained by the owner of the Mohren-Apotheke pharmacy, but he had to deal with unfair competition from other pharmacies counterfeiting the Balsam. An attempt was made to determine where the found bottle came from. In the course of the research, it was found that the medicine certainly does not come from authorized production sources, as evidenced by accurate label comparisons.

1. Historical Jerusalem Balsam found in Skarszewy

In 2004, during the renovation of the tenement house in the market square in Skarszewy in Pomerania (Haller Square 4), among other exhibits, a small bottle ⅓ filled with liquid was found under the attic floor of the house. The bottle was labeled "In Nazareth Aechter Jerusalemer Balsam im goldnen Engel" (The True Jerusalem Balsam of the Golden Angel in Nazareth). It was found along with numerous bottles and pharmacy containers made of glass, wood and stoneware. It is very likely that in the 19th century there was a pharmacy (later transferred to another building on the market square) or a pharmacist's apartment in this tenement house (Fig. 1). The pharmacy containers bear the names of pharmacists: A. Bieber and G. (perhaps C.) A. Jahn. On one of the found beech lids (Fig. 2) there is a caption: Königl. Pr. Apotheke (Königlich privilegierte Apotheke), below this caption there is an image of a black Prussian eagle, probably the pharmacy was called Zum schwarzen Adler (Under The Black Eagle), then the poorly preserved (handwritten) name of the medicine and Schöneck (German for Skarszewy), as well as a blurred date, presumably 1878.

Fig. 1: A postcard from the beginning of the 20th century. The tenement house where the Jerusalem Balsam was found is visible as first on the left with the signboard „Hugo Reiske" on the facade. The highlighted name Schöneck is Westpreußen for Skarszewy.

Fig. 2: Beech wood lid with inscription: Königl. Pr. Apotheke (Königlich privilegierte Apotheke), found in Skarszewy (most probably from 1878).

Since 2006, the discovered objects and documents have been exhibited at the Skarszewy Center for Historical Expositions, which is located in the building of the 19th-century municipal school at 9 Szkolna Street. In August 2014, collectors Maciej Mostowy and Edward Zimmerman shared the valuable find from a tenement house in Skarszewy with the Herbarium of St. Francis at the Order of the Friars Minor in Katowice-Panewniki, where research has been conducted on the history of the Jerusalem Balsam for years. The contents of the bottle were subjected to analytical tests (Kurkiewicz et al. 2017, 2020, Łyczko et al. 2020, Baran et al. 2017), while the bottle became an inspiration for historical research. To the best of the author's knowledge, this is the only historic sample of the Jerusalem Balsam that has been analysed using modern analytical techniques.

The label "In Nazareth Aechter Jerusalemer Balsam im goldnen Engel" leads to the Mariańska Hill (German name Spittelberg) near Kłodzko (Glatz) and the Sanctuary of Mary Consoler of the Afflicted with the Way of the Cross. In 1846, the post of a watchman was taken by a 26-year-old Johannes Treutler, who has made a significant impact on the history of this place (Schittny 1933; Schittny 1991, 1992, 2015). He was born in 1820 in the small village of Hannchen, in Rokytnice County in Czechia. He was a weaver by profession, orphaned early by his father and brought up by his mother. However, the poorly paid profession of a weaver did not seem to be satisfactory for him, he had a much greater ambition to raise his social status and living standards. When he moved to Silesia, he began to apply for admission to the third order of Franciscan brothers. It was a secular order whose members did not take church vows but had the right to wear the habit. He was admitted on November 14, 1845 by priest Franz Brandt from Nowa Ruda (Neurode), a year later, on November 14, 1846, he was appointed the position of a watchman in the chapel on Mariańska Hill (Spittelberg).

A new period in Treutler's life had begun which looked more promising than his previous occupation. However, he was not satisfied enough as the care of the Marian sanctuary gave a roof over his head, but the lack of a fixed salary was disappointing. Living on donations from pilgrims allowed for a very modest existence. This is probably the reason why the hermit decided to look for happiness elsewhere and moved to Krzyżnik (Kreuzberg) near Złoty Stok (Reichenstein) in 1854. It is not fully known whether he was only involved in spiritual activities there, or whether he was looking for other ways to obtain a satisfactory livelihood, but it is known that he was unsuccessful and in 1860 he returned to Mariańska Hill (Musiał 2011).

He brought with him a valuable drug formula, thanks to which he could finally consistently build his prosperity. This is how the great career of the Jerusalem Balsam in Silesia began. Immediately after his arrival, he began to personally manufacture and sell the Balsam as a liquid wound plaster and named it "In Nazareth Aechter Jerusalemer Balsam im goldnen Engel".

The Jerusalem Balsam was often applied as a sort of panacea. According to first practitioners, the Balsam was supposed to be applied externally to support healing of all sorts of injuries, bruises and skin conditions. The literature also reports oral application to treat stomach ache, haemorrhoids, headaches and dizziness, ear and gums infections, tooth ache, blood spitting and heart disease, as well as prophylactic use in times of plague (Moussaieff at al. 2005). However, in such cases, only a few drops of the Balsam were used, and heavily diluted.

The hermit's professional approach to production and sales was admirable. He sold the Balsam not only to pilgrims coming to the sanctuary under his care, but also carried out orders by mail. Over time, his income increased, and he achieved the wealth he had dreamed of.

2. The source of the Jerusalem Balsam recipe

Treutler promoted himself as the inventor of the recipe because it strengthened his image and improved sales (Schittny 1933; Schittny 1991, 1992, 2015), but the sources of its origin could be different. Musiał (2011) indicates two possibilities of obtaining the recipe by the hermit Treutler. In his opinion, it could have come from two orders operating in the Kłodzko region. First, he lists the Order of St. John, whose commandery was established in Kłodzko in the late eighties of the 12th century. As early as in the mid-12th century, Johanniters looked after knights in Jerusalem in accordance with their own detailed regulations concerning the care of the sick. From the 17th century, the order had a pharmacy school in Malta, and it ran two hospitals close to Kłodzko. It is highly probable that the Johanniters had a recipe from Jerusalem and it might have come into the possession of hermit Treutler (Musiał 2011). The second order mentioned by Musiał are the Jesuits who brought yerba mate and quinine to Europe. They owned numerous pharmacies where they trained pharmacists and doctors. They were the successors of the Johanniters in Mariańska Hill. It is possible that they also had a recipe for the balsam that could have been shared with Treutler (Musiał 2011).

However, according to our interpretation, the most credible version seems to be that Treutler received the recipe in 1859 from priest Augustin Staude, who brought it from a pilgrimage to the Holy Land. In this way he wanted to improve the hermit's life. He was taught the method of production by the pharmacist Louis Ambrosius, the owner of the Hirsch-Apotheke (pharmacy) in Kłodzko, who also supplied him with the necessary ingredients (Schittny 2015) as the production started one year after the meeting with Father Staude. That is probably how much time he needed to organize all the necessary resources and equipment.

The recipe brought from Jerusalem was created in 1719 by the Franciscan Fr. Antonio Menzani da Cuna (of Cuneo) in the once world-famous Franciscan Pharmacy at the convent of Saint Savior in Jerusalem (Bagatti 1946). Father Antonio ran this pharmacy for 43 years (from 1686), working on the formula of the balsam from the very beginning. According to the description of his biographer, Fr. Antonio worked on the formula of the balsam for 24 years, the balsam itself was presented as the greatest achievement of this pharmacy, and its properties were published in a special work *Diarium Terrae Sanctae* (Bagatti 1946).

According to reports from pilgrims and researchers visiting and describing the pharmacy, it was the only facility in Palestine that provided medical services at the European level. The equipment of the pharmacy and its functioning aroused admiration also among many other visitors (Mariti 1790). The testimony of the Swedish naturalist Fredrik Hasselquist, who visited the pharmacy in 1751 is of particular value (Hasselquist 1766):

„I saw what I do not esteem the least curiosity in Jerusalem. This was the Pharmacopeia of the Latins; which, on account of the rich stores of Drugs and Medicines, may safely be reckoned one of the most valuable in the world. It was amazing to see what quantities of the dearest drugs their magazine contained. All sorts of balsams were to be found here, to the value of some thousand piasters. Here were several pounds of the valuable Mumio mineralis from Persia, which is sold at three ducats. The Indian and American drugs come all from Spain, and are chiefly given as presents. Here is prepared the Jerusalem Balsam, famous in these countries, which is a preparation made of all kinds of balsams, and a number of aromaticks dissolved in spirit of wine. Of this they make yearly, in the summer solstice, a quantity that costs 150 ducats at Jerusalem. It is very useful in all fresh external wounds; but too hot to give internally. However, they give it in blood-spitting and contusions, from ten to twelve drops. The whole Pharmacopoea is valued at 100,000 piasters" (Hasselquist 1766).

The Franciscan friars were the only ones in Jerusalem who could help both Christians and Muslims. However, it was not only a privilege, but also an obligation which, in the event of failure of the treatment, was threatened with death. Since the Muslim religion prohibits the production and consumption of wine and other alcoholic beverages, Christians in the Middle East were allowed to produce wine only under the privilege of the sultan (a document called firman), and use it only for liturgical purposes. However, these restrictive orders were circumvented.

The Friars Minor were in the Middle East to look after sanctuaries commemorating biblical events. This happened after the defeat

of the Crusaders in 1187 at Hittin, when the Muslim army led by Saladin conquered Jerusalem and displaced Christians from Palestine (Runciman 1987). The Palestinian population remained without any medical care. Hence, the Franciscans also dealt with healing and charity work from the beginning of their stay.
The pharmacy was founded in 1620 (Schittny 2015), however, the first reports of the healing activity of the Franciscans date back to 1583, and they concern the activity of brother Jan of Lübeck, who helped a Dutch pilgrim staying there (Cotovicus 1619). The monks working there were well educated at European universities. However not theoreticians, but practitioners were sent to work in the Custody of the Holy Land, who could meet the needs existing there, both in terms of diagnosing and producing the necessary medications. The mentioned author of the recipe of the Jerusalem Balsam, Fr Antonio Menzani da Cuna, was one of such people.

3. Composition of the Jerusalem Balsam

The most extensive recipe calls for using forty different ingredients (Schittny 2015), the simplest variant of the recipe prescribed just four ingredients: olibanum, myrrha, aloe and mastix. Such a recipe resulted in a cheaper variant of the Balsam, which could be sold to poorer patients. Nonetheless, a modern study conducted by Moueeaieff et al. (2005) has shown that such Balsam still has a strong anti-inflammatory, anti-septic and anti-radical effects. The four ingredient version of the recipe has also originated in the Franciscan Order in 1778, which is almost half a century after the death of Fr. Antonio Menzani (Moussaieff et al. 2005).
Other recipes assume that different components are used interchangeably. The formula of the Jerusalem Balsam by Fr. Antonio was based on a mixture of St. John's wort extract with concentrated ethanol solutions of various types of resins and balsams. Resins are plant secretions, especially from conifers, in solid or amorphous form. They can be colorless, light yellow, brown or black. In the period from the 18th to the mid-20th century, about 40 different resins were used to make medicinal potions. Their description was found in many books, for example in Friedrich Oesterlen's *Handbuch der Heilmittellehre* there is a description of 39 resins (Oesterlen 1861). In the recipe from the Jerusalem Pharmacy, apart from St. John's wort extract, there were, among others, the following resins: *Olibanum*, *Myrrha*, *Styrax*, *Mastix*, *Balsamum peruvianum*. The recipe used by Treutler, as proved by Hans Richard Schittny, had the most important ingredients of Fr. Antonio's Jerusalem recipe. Both recipes showed some similarity to the more than 110 years older recipe (*Balsamum vulnerarium efficacissimum*) hence these recipes were selected for comparison (Table) (Schittny 2015).
As shown in the Table, in all three balsams about 15% of raw materials were contained in the group of substances listed in points 1 to 7, and alcohol constituted from about 66% to about 82%.

Table: Comparison of the recipes of Jerusalem Balsams

No.	Ingredient	Year					
		1608		1719		1860	
		[g]	[%]	[g]	[%]	[g]	[%]
1	Flor{es et Granae} Hyperici	420.0	10.93	140.0	5.46	37.5	2.42
2	Olibanum {Maschio}	52.5	1.37	35.0	1.36	15.0	0.97
3	Myrrha {Electa}	52.5	1.37	35.0	1.36	15.0	0.97
4	Styrax*	70.0	1.82	17.5	0.68	15.0	0.97
5	Aloe**			35.0	1.36	45.0	2.91
6	Balsamum Peruvianum			105.0	4.09	105.0	6.78
7	Benzoe*			17.5	0.68		
	together 1 - 7		15.49		15.01		15.01
8	Mastix	35.0	0.91			15.0	0.97
9	Mumio {mineralis}	52.0	1.35	8.8	0.34		
10	Radix Angelicae			35.0	1.36	30.0	1.94
11	Moschus {orientalis}			4.5	0.18		
12	Ambra {grisea}			4.5	0.18		
13	Crocus					8.0	0.52
14	Terebinth	630.0	16.40				
15	Other Ingredients	9.0	0.23	28.0	1.09	13.0	0.84
16	Spiritus vini rectificati	2520.0	65.61	2100.0	81.85	1250.0	80.72
	TOTAL	3841.0	100.00	2565.8	100.00	1548.5	100.00

* the form of Styrax in lacrimis or Styrax Calamita; Styrax and Benzoe are synonyms
** Aloe Succotrini and/or Lignum Aloe, proportions unknown, most often 1:1
{ } supplementing the names according to the recipe written in the first half of the 18th century - document in the possession of the State Archives in Venice (Schittny 2015)
1608 – Balsamum vulnerarium efficacissimum, Basilica Chymica, Oswald Croll
1719 – Balsamum di Gerusalemme, Father Antonio Menzani de Cuna, Jerusalem
1860 – Jerusalem Balsam – hermit Johannes Treutler, Mariańska Hill near Kłodzko
Source: Schittny 2015

3.1. Ingredients used in the recipe of the Treutler's Jerusalem Balsam from 1860

3.1.1. Hypericum perforatum L.

A plant belonging to the St. John's wort family. It occurs naturally in Europe, West Asia and North Africa, prefers dry chalky soils in sunny places, in wastelands, on the fringes of meadows and forests, in clearings as well as on paths and forest clearings. Blooms from June to September. It is one of the best-studied plants, recognized as the medicinal plant of 2015 (Greeson et al. 2001; Ganz 2015). St John's wort was used in ancient times as a treatment for burns, snake bites, fever and wounds. In the Middle Ages, it was credited with magical powers. In the 16th century, Paracelsus recommended it for hyperactivity, neuralgia and sciatica (Mullaicharam and Halligudi 2018).
Nowadays, hypericin containing St. John's wort is used to treat depression since it is a monoamine oxidase (MAO) inhibitor. In addition, St. John's wort inhibits the reabsorption of dopamine, serotonin, gamma-aminobutyric acid GABA, glutamate and norepinephrine, which causes joy, satisfaction and even euphoria (Greeson et al. 2001; Ganz 2015; Mullaicharam and Halligudi 2018).
Due to the numerous ingredients of St. John's wort, its oil and hydro-alcoholic extracts are used to treat difficult-to-heal wounds. St John's wort extracts have also antibacterial effects. The naphthodianthrones contained have antiviral properties, carotenoids, chlorophyll and floroglucin derivatives stimulate wound healing (Saddiqe 2010; Barnes et al. 2001).

3.1.2. Olibanum – frankincense (Boswellia)

Olibanum is a gum resin obtained from the trees of the genus *Boswellia* found in northern and north-eastern Africa and the Indian peninsula (Włodarczyk 2011). It is used in Ayurvedic medicine in the treatment of inflammation of joints and bones, inflammation and pain of the spine, catarrh of the respiratory system, neurotic and anxiety conditions (Al-Yasiry and Kiczorowska 2016).
Scientific research also confirmed the anti-cancer effect of *Olibanum*. Boswellia acids contained in frankincense show inhibitory properties against human leukemia *in vitro* cells *(human leukemia* HL-60 cell culture) by blocking DNA synthesis (Huang et al. 2000). Also, cembrane diterpenes inhibit the growth of these kinds of tumor cells (Wang et al. 2009). Boswellic acids are an inhibitor of *colorectal cancer* (CRC) (Takahashi 2012). The aforementioned substances disturb the mitochondrial membrane potential in oncocytes, inhibit DNA synthesis, stimulate apoptosis and inhibit topoisomerase I and II (Chashoo et al. 2011).
Numerous reports confirm the particular usefulness of *Boswellia serrata* and *Boswellia carteri* extracts in the treatment of rheumatic diseases, colon ulcers, irritable bowel syndrome, bronchitis and sinusitis. Inhibition of the proliferation of leukemia and glioblastoma tumor cell lines was demonstrated *in vitro* (Goethe et al. 2018). There are indications of the justified use of *Olibanum* in the adjunctive treatment of brain cancer. *Boswellia* components have anti-tumor activity by inhibiting topoisomerase I and II-alpha and by stimulating programmed cell death (apoptosis) (Al-Yasiry and Kiczorowska 2016).

Olibanum is also used to treat metabolic syndrome and related disorders such as hyperglycaemia, dyslipidaemia, hypertension, obesity and diabetes. The Boswellia species also act as anticoagulants. It has also been found to have antioxidative properties (Mahdian et al. 2020).

3.1.3. Commiphora myrrha

Myrrh is a gum resin obtained from the balsam myrrha (*Commiphora myrrha* (Nees) Engl.) species from the Burseraceae family. The plant is a tree or shrub that grows up to 10 m tall. It occurs naturally in the Arabian peninsula and Africa. In the past, myrrh was used for embalming and anointing a corpse as well as a medicine and painkiller. It is still used in the manufacture of medicines and cosmetics. It is added to toothpastes to help prevent gingivitis and reduce bad breath. Myrrh inhibits the growth of bacteria, fungi and protozoa (Podbielkowski 1989; Hanuš et al. 2005; Shen et al. 2012).

The main components of the resin of myrrh are sesquiterpenes, diterpenes, and diterpenic acids, whereas in the leaf stalks there are flavonoids and lignans (Su et al. 2011; Mohamed et al. 2014). The terpenes present in myrrh embalmer are cytotoxic and genotoxic to mouse Ehrlich ascites carcinoma cells. The potency of cytotoxicity against these neoplastic cells is comparable to the cytotoxicity of cyclophosphamide (Qureshi et al. 1993).

In combination with licorice root and plantain root, myrrh is used to treat gastroenteritis and enteritis. Combined with zinc ointment, it accelerates wound healing (Podbielkowski 1989; Elzayat et al. 2018).

However, it can also cause side effects. In animal studies (rats and mice), *Commiphora myrrha* extracts were found to be toxic at doses of 200 mg/kg/body and more. Severe liver damage and histological changes in the form of renal tubular cell degeneration, and shrinkage of the glomeruli have been observed in experimental animals (Omer and Al-Dogmi 2018; Mekonnen et al. 2003).

3.1.4. Styrax

Benzoic resin – *Resina benzoe* is obtained from the tree *Styrax benzoides* or *Styrax tonkinensis*. It is found in Sumatra and Indonesia (Sharif et al. 2016). It contains derivatives of benzoic acid, hydroxybenzoic acid, cinnamic acid and hydroxycinnamic acid. Cinnamic, vanilla and hydroxycinnamic acids have anti-inflammatory, analgesic, and chemopreventive effects, delaying or inhibiting the growth of cancer. They are particularly active in prostate cancer, breast cancer and liver cancer (Rocha et al. 2012). It also exhibits expectorant, antiseptic, antifungal, choleretic, diuretic, diaphoretic, antipyretic, analgesic, heart rate-accelerating, disinfecting for intestines and urinary tracts, anti-arthritic and anti-rheumatic properties (Sharif et al. 2016; Du et al. 2016).

3.1.5. Aloe succotrina

Fynbos aloe (*Aloe succotrina*) is a species found in Cape Town and the Southwestern tip of the Western Cape, Africa. The name derives from the plant's alleged place of origin on the island of Socotra or from the Latin word *succus* meaning juice or *citrinus* – lemon yellow (Eggli and Newton 2010; Newton 2001). It is one of the biblical plants. Its active ingredients include acetylated mannans, polymannans, anthroquinones and anthraquinone glycosides, anthrones, lectins (Cock 2015). In ancient times, it was used for embalming bodies. In the Middle Ages, dried *Aloe vera* juice was used as an ingredient in ointments to heal skin diseases and wounds. *Aloe succotrina* was considered the best species for these purposes, but was also the most expensive (Eggli and Newton 2010; Newton 2001). It is also used to treat burns and infections (Cock 2015).

3.1.6. Lignum aloe

Aloeswood, agarwood, or gharuwood is a fragrant, dark, resinous wood used in incense and perfumes. It is formed in the core of *Aquilaria* trees, but only under specific conditions, when they become infected or damaged (López-Sampson and Page 2018; Hashim et al. 2016). Medicinal use is related to its anti-inflammatory action and is used in the treatment of rheumatism, arthritis, gout, asthma and body pain. There are also reports in the scientific literature that *Aquilaria* spp extracts have anti-allergic, anti-ischemic (cardioprotective), anti-cancer, antimicrobial, anti-depressant (effects on the central nervous system) activities, antioxidant effects and mosquitocidal properties. The main ingredients of aloeswood are phenolic acids, phytosterols, flavonoids, benzophenones, xanthonoids, terpenoids, and fatty acids (Hashim et al. 2016).

3.1.7. Mastix

Mastic – resin obtained from *Pistacia lentiscus* L., growing in North Africa, the Canary Islands, Western Asia and Southern Europe (Nahida et al. 2012). The main ingredients are triterpene acids, oleanic acid and triterpene alcohol (He et al. 2007). It accelerates wound healing and has antiseptic, anti-inflammatory and analgesic properties. It is used in stomach ailments and as a component of patches for teeth filling. In 2014, a cytostatic and antiproliferative effect was described against breast cancer and liver cancer (Sobral et al. 2014).

3.1.8. Balsamum peruvianum

Balsamum peruvianum is obtained from *Myroxylon balsamum* Harms var. *pereirae* Leguminosae and belongs to the Fabaceae family, growing in South America (Custódio and Veiga-Junior 2012). It is a dense, dark brown liquid with a pleasant smell. The taste is bitter and its composition includes phenolic acids and their esters, terpenes and polyphenols. The main ingredient is cinnamin – a derivative of benzoic and cinnamic acids (de Groot 2019).

It has an antimicrobial, antibacterial, antiseptic, analgesic and anesthetic effect. It reduces swelling and speeds up wound healing. It improves skin and subcutaneous circulation hence, it has been used in the treatment of chronic ulcers, decubitus, eczema, pruritus, scabies, haemorrhoids and frostbite, nappy rash and intertrigo (de Groot 2019). Unfortunately, the Peruvian balm can cause allergy. Ingredients causing allergies include benzoic acid, benzyl acetate, and cinnamic acid. Allergy to Peruvian balm may appear in the form of urticaria and itching, eruptions and other skin lesions that are difficult to treat, food allergy (vomiting, diarrhea, nausea, abdominal pain) (Hausen et al. 1992; Scardamaglia et al. 2003; de Groot 2019; Uter et al. 2020).

3.1.9. Radix angelicae

Angelica archangelica grows wild in mountainous and humid regions of Europe and Asia. The root contains approximately 1% of the essential oil, mainly composed of D-alpha-felandrene, alpha-pinene, limonene, beta-caryophyllene, linalool, borneol (Sowndhararajan 2017). The root also contains macrocyclic lactones, angelic acid and other organic acids with various structures, carbohydrates, flavones, beta-sitosterol and many other compounds (Różański and Iwiński 2019; Fraternale et al. 2014).

Due to the content of furanocoumarins, the raw material has a phototoxic effect and may cause skin inflammation. It is diastolic, carminative, antiseptic and calming (Kumar et al. 2011). Spirit and angelica oil are used for neuralgia and rheumatic pains, they improve the blood supply to the skin and help in the subsidence of periarticular and traumatic exudates (Uter et al. 2020, Sowndhararajan et al. 2017).

Unfortunately, angelica has a photosensitizing effect, which may cause allergy with erythema, itching, burning or hives (Hofmann et al. 2020).

3.1.10. Crocus sativus

Saffron is one of the most expensive spices. To get 1 kg of saffron stigmas, 150 thousand flowers need to be harvested (Gracia et al. 2009). The raw material is supplied by a species – saffron, popu-

larly known as crocus – *Crocus sativus* L., which is growing in Asia, Africa and Southern Europe as a spice and medicinal plant. 90% of saffron production takes place in Iran (Samarghandian and Borji 2014). Important active ingredients of saffron include: carotenoids, monoterpene aldehydes, monoterpenoids, isophorones and flavonoids (Hosseinzadeh and Nassiri-Asl 2013). Much research has been done on its anticonvulsant, antigenotoxic, hypolipidemic, antipruritic, analgesic, anti-inflammatory and antioxidant effects. The healing properties of saffron have been known and used in traditional medicine in many countries (Hosseinzadeh and Nassiri-Asl 2013; Abdullaev and Espinosa-Aguirre 2004).

Saffron has a specific calming effect. It eliminates vegetative neuroses, reduces the tension of skeletal and smooth muscles, calms tremors and uncontrolled excessive agitation. It does not impair mental processes and concentration, on the contrary, it has a psychostimulating effect on many people, it improves the process of remembering and recreating information. It helps in mental and motor concentration and removes symptoms of depression and stress. It is also considered an aphrodisiac (Moshiri et al. 2015). It works as a cholagogue, antiseptic and stimulates the digestive tract. It lowers blood cholesterol levels and inhibits the development of atherosclerosis. Initial clinical studies demonstrated the anti-cancer effect of carotenoids contained in saffron (Abdullaev 2002; Samarghandian and Borji 2014). In toxicological studies in mice, it was shown that high doses up to 5 g/kg were well tolerated. However, people with chronic diseases should take it after consulting a doctor. It is absolutely contraindicated for pregnant women as it may stimulate uterine contractions (Samarghandian and Borji 2014).

4. The popularity of the Jerusalem Balsam in Silesia and Europe

The functions and duties of hermits were regulated by special statutes issued by Pope Benedict XIII. According to them, in addition to taking care of the sanctuary, the hermit was also obliged to take care of the pilgrims coming there, which gave Treutler the opportunity to distribute the Jerusalem Balsam (Musiał 2011). The fact that one could buy precious medicine on Mariańska Hill increased the prestige and the importance of this place. It became extremely popular, which resulted in an increase in the number of arriving pilgrims. The hermit's devout appearance and the information he disseminated that he was the inventor of the recipe for the medicine were instrumental in increasing Treutler's sales and therefore income. It was also reported that he was using plants grown in his own garden to produce. No one was bothered by the fact that, according to the aforementioned statutes of Benedict XIII, only books allowed by the church authorities could be kept in the hermitage. He was believed to be a man "inspired" by God.

Of course, the high effectiveness of the balsam also contributed to the popularity of the balsam. It was used orally in the amount of a few drops diluted in water as a medicine to alleviate stomach ailments, and also externally as a medicine for wounds (Schittny 2015; Musiał 2011). Six years after the start of production, its remarkable effectiveness in treating wounds turned out to be useful for Prussian soldiers. Injured soldiers did not have pharmacy disinfectants at their disposal, so they needed an effective remedy for extensive, contaminated wounds:

"When in 1866 (in the so-called German war) the soldiers of the Prussian king drove in crowds through the Kłodzko region against Austria, they even demanded this medicinal tincture, and when they returned to their homeland after the war, all Prussian countries were immediately filled with admiration for the Kłodzko Jerusalem Balsam (Schittny 2015)".

Thus, the war contributed to the increase in popularity of Treutler's balm outside Silesia. The number of orders processed by mail has increased significantly, however hermit seemed to manage this challenge as seeing the bills issued by him suggest a large amount of medicine sold. For recognition, the sender's address "Johannes Treutler – Einsiedler – Spittelberg b. Glatz" (Johannes Treutler – hermit – Mariańska Hill near Kłodzko) was embossed on the sent papers in the form of a stamp (Schittny 2015).

The dreams of a hermit's prosperous life came true. With time, he earned three houses, and his wealth was additionally evidenced by the fact that he owned a horse-drawn cart. However, not everything went smoothly. The hermit's wealth must have made some people jealous, which is possibly why someone reported that he was making his balsam without proper authorization. In those days, there were already regulations that ordered medicines have to be manufactured in pharmacies. As the pharmacist Louis Ambrosius of the Hirsch-Apotheke testified in court, he was not selling the finished product to the hermit, but only ingredients, a sentence was issued forbidding him to make the balsam. However, it was not in the nature of the hermit to give up, especially since his fame as the inventor of the recipe had already spread. He started secretly making the balsam. He stopped cooperating with Ambrosius and turned for help to the pharmacist Johannes Schittny, owner of the Mohren-Apotheke (Schittny 2015: Musiał 2011).

Much greater pain for Treutler caused the deprivation of the right to wear the monastic habit on September 16, 1868. This happened because wealth did not benefit the character of the hermit, and the monastic authorities heard rumors of his inappropriate behavior. During a dance party in a Kłodzko inn, he drank wine without moderation and danced with women, which aroused disgust for many people (Schittny 2015). The dances with the soldiers aroused even greater indignation, and he was accused of having too close contacts with protestants and allegedly failing to show due respect to a priest carrying the Blessed Sacrament (Musiał 2011). The accusations must have been numerous since his patrons decided to take away this privilege from him.

Treutler died on February 11, 1892 of heart failure. He left behind a rich legacy, which he bequeathed to the Franciscan Nuns Hospital in his will, with the reservation, that if a Franciscan order appears in the vicinity of Kłodzko, then they will be entitled to inheritance. It was certainly an expression of gratitude for the help received from the order. The nuns were not able to produce the balsam, so they issued a license for sale, which was bought by Treutler's last associate – the pharmacist Johannes Schittny (Schittny 2015). However, other pharmacists, especially the prescription owner of the Hirsch-Apotheke, also wanted to make profit. After the hermit's death, many nearby pharmacies began producing their own balsam. However, the biggest dispute arose between the owners

Fig. 3: Bottles with the Jerusalem Balsam (A) produced by Mohren-Apotheke after the death of the hermit Treutler, (B) produced at Mohren-Apotheke after a successful trial for the right to use the Treutler trademark, and (C) produced at Hirsch-Apotheke after a lost trial for the right to Treutler's trademark.

of the Mohren-Apotheke and the Hirsch-Apotheke. Pharmacist Johannes Schittny started a court battle against Louis Ambrosius for unlawfully using the proprietary name "Hermit Treutler". The dispute lasted for many years. The settlement was not signed until 1932 (Schittny 2015).

The Mohren-Apotheke reserved the trademark of "a pilgrim with a cane", while the Hirsch-Apotheke has a "portrait of an old man" embossed on the bottle (Fig. 3). In 1933, the successor of Johannes Schittny, Dr. Richard Schittny, after the settlement, published an article in "Schlesische Monatshefte. Blätter für Kultur und Schrifttum der Heimat" about the hermit, in which he announced that since hermit's death, the license belonged to the Mohren-Apotheke and described the exact appearance of the label (Schittny 1933). In this way, it made its competitors understand that it was legally protected against abuses and that no one could pretend not to know about it.

5. The origin of the Balsam from Skarszewy

The bottle found in Skarszewy is small. Its length is 107 mm, the base is 18 mm wide, and the neck is 20 mm long. The label on it is 54 mm long. A stopper was used to protect the contents of the bottle, which was additionally sealed (Fig. 4).

Fig. 4: Bottle with the Jerusalem Balsam (A) found in Skarszewy and (B) bought by Prof. Witold Musiał on the Collector's Exchange in Wrocław.

It is not known what entity manufactured the Jerusalem Balsam found in Skarszewy. It was certainly produced after the death of the hermit Treutler. The bottle does not resemble the preserved historical bottles used to sell Jerusalem Balsams at the beginning of the 20th century. As already mentioned, the label "In Nazareth Aechter Jerusalemer Balsam" refers to the hermit Treutler, as he was selling his medicine under that name. In turn, the use of the image of a pilgrim with a cane, in accordance with the agreement of 1932 between pharmacies in Kłodzko, was entitled to the owner of the Mohren-Apotheke. So one might assume that the product comes from this pharmacy. However, careful examination of the label raises considerable doubts. Firstly, on the label of the pharmacy in Kłodzko, the inscription is under the image of a pilgrim with a cane, and the inscription on the label of the bottle from Skarszewy is separated, partly under the drawing and partly above it. The pilgrim also looks different, on the label from Skarszewy his hat is smaller, the brim is round and its contours are marked. On the label of the Mohren-Apotheke, the hat has an oval brim, longer at the front and it is black. The canes in the hand of pilgrims also differ. The cane of the Kłodzko pilgrim is shorter, reaches the brim of the hat, and the cross that ends it is completely straight (it has the shape of a Latin, Christian cross). The cane of the pilgrim from Skarszewy is longer, protruding above his head, and the cross ending it is more decorative, its shoulders are wider at the end and narrow to the base (they resemble a knight's cross, referring to the shape of the cross of the Knights Hospitallers and Templars) (Brighton 2006). The hermitage in Mariańska Hill is also presented differently on both labels. The ornament under the words "In Nazareth" is also different. The bottle from Skarszewy is similar to a slightly larger bottle bought by Prof. Musiał on the Collector's Exchange in Wrocław (Musiał 2011), but the bottle labels differ in details.

Based on the differences in labels, it should be recognised that the Balsam found in Skarszewy was not made at the hermit Treutler's, or at the Mohren-Apotheke or Hirsch-Apotheke in Kłodzko. Probably, despite the acquisition of a license and registration of the trademark by the Mohren-Apotheke, there were amateurs who wanted to earn money on the hermit's famous product and did not intend to respect the law of the pharmacy in Kłodzko. It follows that the lack of respect for copyrights or licenses and product counterfeiting are problems present for decades.

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