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Historical development and ethical considerations of vivisectionist and antivivisectionist movement*

ABSTRACT

This review presents historical development and ethical considerations of vivisectionist and antivivisectionist movement. In this respect it shows that both movements were not just characteristic for the past one hundred years, but that they were present since the beginning of medical development. It, thus, re-evaluates the accepted notions of the earlier authors. On this track it suggests that neither movement was victorious in the end, as it could be seen from the current regulations of animal experiments. Finally, it puts both movements into a wider context by examining the connection between antivivisectionism and utilitarianism on the one hand, and vivisectionism and experimentalism on the other hand.

Key words: vivisectionism; antivivisectionism; bioethics; utilitarianism; experimentalism

Introduction

This review will try to present historical development and ethical considerations of vivisectionist and antivivisectionist movement in order to re-evaluate the accepted notions of the earlier authors. Firstly, it evaluates the Lansbury's notion that antivivisectionism was characteristic for the North European Protestant countries like England and Sweden, while vivisectionism was characteristic for the South European Catholic countries like France and Italy.¹ Then, it proceeds to the Mason's over-

¹ Lansbury C. *The Old Brown Dog – Women, Workers, and Vivisection in Edwardian England*. Madison: The University of Wisconsin Press; 1985.

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simplification that suffragette proponents in their fight for the rights of women and other oppressed groups were naturally antivivisectionist activists.² Finally, it discusses the French's notion that the antivivisectionists had no regard towards animals, while the vivisectionists had profound feelings towards them.³ It will, thus, try to show both mentioned movements in a new light.

Vivisectionism (Latin *vivus* = alive and *sectio* = cutting) denotes a biomedical research based on animal experiments, while antivivisectionism encompasses various activities directed against it.⁴ While on the one hand vivisectionism is inseparably connected with experimentalism, on the other hand, antivivisectionism gets its fuel from utilitarianism. The former term defines theory and practice of a scientific research grounded on experiments, which in medicine involves animals, conducted in order to validate scientific hypotheses, and the latter term describes philosophical theory which judges human activity based on its consequences, characterising it to be morally right, if it causes the greatest happiness for the greatest number of living creatures, which includes animals as well.⁵

Regarding 'experimentalism' one should make a distinction between 'experimentalism' as a way of medical research and 'experimentalism' as one of the three phases of medical development, each one characterised with its own dominant paradigm.⁶ 'Clinical medicine' (Greek *Kline* = bed) was established by the 'Father of medicine' Hippocrates (460-377 BC) and it was based on the direct observation of an ill patient and the consequent rationalistic theoretical conclusions. The next phase 'hospital medicine' (1794-1848) was formed as a result of the French Revolution under the direction of the French physician Francois Xavier Bichat (1771-1802) It was characterised with the treatment of all patients, and not just the poor ones as had been the practice before, in the hospitals. Unsuccessful treatments were followed by the pathological sections of deceased patients, which enabled physicians to make the empirical connections between clinical signs and pathological changes.⁷ Finally, in the mid 19th century the French physiologists Francois Magendie (1783-1855) and Claude Bernard (1813-1878) have formulated experimentalism as a method of an investigation of the body processes through animal vivisections which gave rise to

² Mason P. *The Brown Dog Affair – the Story of a Monument the Divided the Nation*. London: Two Seven Publishing; 1997.

³ French RD. *Antivivisection and Medical Science in Victorian Society*. Princeton: Princeton University Press; 1975.

⁴ Rupke NA. 'Introduction'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London and New York: Routledge; 1987.

⁵ Agnes ME (editor). *Webster's New World College Dictionary*. Foster City: IDG Books Worldwide; 2001.

⁶ Grmek MD. *Medežjin kotao*. Zagreb: Art trezor naklada; 2004.

⁷ Foucault M. *The Birth of the Clinic*. London and New York: Routledge Classics; 2005.

'laboratory medicine'. In this respect gradual shift of the physicians' interest from the clinical signs, over the pathological findings, towards the disease pathogenesis could be identified.⁸

The Antiquity

Both vivisectionism and antivivisectionism were present since the beginning of medical development.⁹ There are numerous records on animal experiments conducted in the Antiquity. Among them the discovery of the function of optical nerve by Alcmeon of Croton around 450 BC should be highlighted. The 'Father of medicine', Hippocrates (460-377 BC), although primarily a follower of rationalism, conducted animal experiments as well, such as the one described in his book *On Heart*, in which he cut pig throat in order to examine the swallowing and opened its thorax with the aim of describing the atrial and ventricular function. The Alexandrian physicians Herophilus (330-250 BC) and Erasistratus (305-240 BC) even conducted the human vivisections on the criminals sentenced to death. The first one thus described the functional difference between ligaments and nerves, and the second one the functional difference between sensory and motor nerves.¹⁰

The Roman encyclopaedist Celso (1st century AD) in his book *De Medicina* attacked the practice of vivisectionism, due to its aim of examining organs in their natural state, rather than with post-mortem changes. He pointed out that it does not take into an account the influence of the pain. The Roman physician Galen (130-210) in his book *De anatomicis administrationibus* described vivisectionist techniques for the examination of breathing, a heartbeat, the recurrent laryngeal nerves, the brain, and the spinal cord. He advised the use of pigs and goats, rather than monkeys, in order to avoid the watching of their painful facial expressions. One should bear in mind that for him, as a follower of stoicism, the mentioned experiments were only aesthetically disturbing, but not ethically as well, due to the fact that according to the mentioned philosophy, animals did not possess a rational soul, and consequently, no personal rights.¹¹

⁸ Ackerknecht EH. *Medicine at the Paris Hospital 1794-1848*. Baltimore: The Johns Hopkins Press; 1967.

⁹ Belicza B. 'Pokusne životinje u znanstvenim medicinskim istraživanjima: povijesnomedicinska promišljanja'. In: Radačić M; Bašić I; Eljuga D (editors). *Pokusni modeli u biomedicini*. Zagreb: Medicinska naklada; 2000.

¹⁰ Belicza B. 'Povijesna uvjetovanost medicinskih znanosti: istraživanja na pokusnim životinjama kao primjer'. In: Lacković Z (editor). *Struktura, metodika i funkcioniranje znanstvenoga rada*. Zagreb: Medicinska naklada; 2004.

¹¹ Maehle AH; Trohler U. 'Animal Experimentation from Antiquity to the end of the Eighteenth Century'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London and New York: Routledge; 1987.

The Middle Ages

Condemnation of human vivisection by the Church Fathers Tertullian (155-222) and Augustine (354-430) led to animal vivisections diminishment during the Middle Ages. Nevertheless, the scholastic philosopher Thomas Aquinas (1225-1274) taught that the Bible had given people the power over animals, and although cruelty towards animals could lead to cruelty towards people, he claimed that there was nothing morally wrong in animal suffering. During the same period, the Bolognese Professor Mondino de Luzzi (1270-1326) introduced anatomical dissections. King of France Louis XI went even further and in 1474 allowed his physicians to open the abdomen of the criminal sentenced to death in order to practice extraction of gall stones. In the Holy Roman Empire, imperial physicians studied the impact of poisons on sentenced criminals, but allowed the survived ones to become free.¹²

The Early Modern Times

In his book *De humani corporis fabrica* published in 1543 the Paduan anatomist Andreas Vesalius (1514-1564) presented his findings based on the human sections and animal vivisections conducted on pigs and monkeys. However, despite his notion that human and animal brains were similar in their composition, he avoided the examination of animal brain, which was in accordance with his denial that animals did not have reason, and could be explained with his fear of charges for heresy. In order to prove his hypotheses on the connection between the voice strength and *nervus recurrens*, he first cut the nerve on the one side of animal throat and observed the loss of a half of the voice, and then on the other side as well and observed the loss of a whole voice. His pupil Realdo Colombo (1516-1559) removed fetuses from a pregnant bitch in order to prove motherly love. The Italian anatomists Jacob Berengar da Carpi (1470-1530), Giambattista Canano da Ferrara (1515-1579) and Gabriel Fallopius (1523-1562), and the German physician Volcher Hoiter (1534-1576) also used animal vivisections in their research. The Cambridge philosopher Sir Francis Bacon (1561-1626) gave programmatic suggestions for the improvement of science through animal vivisections. The Pavian physician Gaspare Aselli (1581-1626) described mesenterial lymph vessels based on his vivisection of a living dog, while the Montpellier physician Jean Pecquet (1622-1674) used the same method in his discovery of *ductus thoracicus*. The Danish physician Thomas Bartholinus (1616-1680) and the Swedish physician Olof Rudbeck (1630-1702) also used ani-

¹² Ibid.

mal vivisections in their examination of lymph vessels.¹³ The English physiologist William Harvey (1578-1657) in his book *De motu cordis et sanguinis* published in 1628, through the combination of human sections and animal vivisections, described the heart beating and blood circulation. He also used the same methods in his examination of the role of an egg in the embryo development. His contemporary Richard Lower (1631-1691) performed blood transfusions from one animal to another and from the sheep to a mentally retarded man. Sir Christopher Wren (1632-1723), John Wilkins (1614-1672) and Jean Baptiste Denis (1620-1704) introduced direct and indirect blood transfusions based on their animal experiments. The English iatrochemist Thomas Willis (1621-1675) used animals in his exploration of pathology and pathophysiology of the brain, the nerves, the digestive system, blood circulation, lymph vessels and pharmacodynamics.

The Dutch physician Jan Swammerdam (1637-1680) was the first one who used frogs as experimental animals in order to examine muscle contraction. The Italian physician Marcello Malpighi (1628-1694) used animal experiments to study chicken embryology and gland histology. His pupil and a colleague, the Croatian iatrophysicist Gjuro Armeno Baglivi (1668-1707), performed animal vivisections on a daily basis. He used deer, hoar, snakes, turtles, and lions in order to explore pharmacokinetics and *dura mater*. In his book *De fibra motrice et morbosa* published in Perugia in 1700 he described his experiments and explained his theory of fibre.¹⁴

The Oxford scientist Robert Hooke (1635-1703) described his experiment of cutting thorax and diaphragm of a living dog in order to examine heart beating, but also highlighted his concerns over its cruelty. Another Oxford scientist Robert Boyle also used animals in his experiments with the air pump, in which he pressured or removed air from the bottle with the animals, but never reused the survived animals. The French philosopher Rene Descartes (1596-1650) in his book *Discours de la Methode*, published in 1637, compared human and animal organisms with machines and automats, but made a distinction between them regarding the human possession of a soul and an ability of speech. The German physician Friedrich Hoffmann (1660-1742) confirmed the mentioned mechanist dogmas and speculations through the combination of observation and animal experiments, which he described in his book *Fundamenta Medicinae*, published in 1695. The Swiss physician Albrecht von Haller (1708-1777) explained physiological processes exclusively based on his animal experiments. The Italian physicians Luigi Galvani (1737-1798) and Alessandro Volta (1745-1827) used animal experiments in order to examine

¹³ Machle AH; Trohler U. 'Animal Experimentation from Antiquity to the end of the Eighteenth Century'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London and New York: Routledge; 1987.

¹⁴ Baglivi G. *De fibra motrice et morbosa*. Zagreb: Prometej; 2007.

electricity as a living phenomenon and, thus, established the foundations of electrophysiology. The Austrian bioenergeticist Franz Anton Mesmer (1734-1815) used animal experiments in proving his theory of animal magnetism. The Paris physician Jean Riolan (1580-1657) highlighted anatomical differences between humans and animals, unnatural conditions in dying animals, and a lack of reasonable foundation for animal vivisections. The Bristol physician Edmund O'Meara (1614-1681) pointed towards the problem in transmission and application of knowledge acquired through experiments on animals into the treatment of humans. His pupil Conlan Cashin highlighted the differences between animals and humans.¹⁵

The 18th century

The 18th century was characterised with the written debate between the Catholic poet and antivivisectionist Alexander Pope (1688-1744) and the Protestant minister and a vivisectionist Stephen Hales (1677-1761) whose experiments were causing public outrage.¹⁶ While the English physician Joseph Addison published his ambivalent attitudes in *The Spectator* and *The Tatler*, Samuel Johnson (1709-1784) in *The Idler* severely criticised vivisectionism. Their contemporary and the Leipzig physician Christlob Mylius (1722-1754) revitalised the Christian anthropocentric teaching that God has created animals to be of use to humans, and thus, concluded that animal vivisections are much lesser evil than human vivisections, and finally with the help of philosophical and mathematical methods proved that, in the mentioned experiments, the human benefit was far greater than the animal pain. The Berlin physician Pierre-Louis Moreau de Maupertuis (1698-1759) went a step further in his claim that vivisections of criminals were a methodological necessity. The debate included philosophy, as well and while the founder of criticism Immanuel Kant (1724-1804) in his book *The Critique of Practical Reason* perceived animals as rightless objects, the proponent of modernism Arthur Schopenhauer (1788-1860) advocated the constriction of animal experiments. The English philosopher and utilitarianism founder Jeremy Bentham (1748-1832) proposed classification of human actions as morally right if they caused the greatest happiness for the greatest number of living creatures, in which he included animals, and, thus, consequently attacked vivisectionism. He insisted that for the animal dignity it was crucial that it could feel pain regardless of its lack of reason and speech. The mentioned notion gave rise to the teocentric teaching, according to which animals should be protected solely

¹⁵ Richards S. 'Vicarious Suffering, Necessary Pain'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London i New York: Routledge; 2007.

¹⁶ Maehle AH; Trohler U. 'Animal Experimentation from Antiquity to the end of the Eighteenth Century'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London and New York: Routledge; 1987.

because of themselves, which was opposed to the anthropocentric teaching, according to which animals existed with the sole purpose of serving humans¹⁷

French Physiologists

Experimentalism became the main method of medical research in the 19th century France. Animal vivisections were equally conducted by physicians, veterinarians and biologists like Pierre Flourens (1794-1867) as a part of their training. Veterinary schools in Lyon (1761), Alfort (1764) and Toulouse (1828) had unlimited supply of various animals, most notably horses. The Alfort veterinarians Pierre Flandrin (1752-1796), Alexis Casimir Dupuy (1775-1849), Armand Charles Goubaux (1819-1890) and Gabriel Constant Colin (1825-1896) used animal vivisections in the solving of physiological problems, while the Lyon veterinarians Auguste Chauveau (1827-1917) and Saturnin Arloing (1846-1911) introduced animal vivisections in anatomical research. Animal vivisections in clinical investigations were used by the Paris physicians Julien Legallois (1770-1814), Guillaume Dupuytren (1777-1835), Nicola Blondlot (1808-1877) and Achille Longet (1811-1871). The Paris physician Francois Xavier Bichat (1771-1802) combined clinical observations, pathological sections and animal vivisections in order to analyze, identify and classify different vital properties which he described in his book 'Recherches physiologiques sur la vie et la mort' published in 1802. He deliberately injured particular organs in experimental animals in order to watch their dying process and connect the caused pathological changes with clinical observations and used thus obtained results for the advancement of human surgery. Although he worked without a microscope, he was the first one to make a connection between the tissue specificity and the pathological process, which made him the 'Father of General Anatomy and Pathology'.¹⁸ Francois Magendie (1783-1855), Professor at the Salpetriere in Paris, and the Member of the College de France and Academie des Sciences, regularly conducted experiments on animals in order to study physiology, which he commented by saying: 'If I were to look for a smile that would express my feelings about the science of life, I should say that it was a superb salon, glittering with light, to which the only entrance was through a long and horrible kitchen'.¹⁹ Worth notice are his papers on nerves, digestion and circulation.²⁰ In order to examine absorp-

¹⁷ Ibid.

¹⁸ Elliot P. 'Vivisection and the Emergence of Experimental Physiology in Nineteenth Century France'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London and New York: Routledge; 2007.

¹⁹ Stahnisch FW. 'Francois Magendie (1783-1855)'. *J Neurol*. 256; (2009): 1950-1952.

²⁰ Clarac F; Boller E. 'History of Neurology in France'. *Handb Clin Neurol*. 95; (2009): 629-56.

tion, he gave a poison to a dog, and observed that there were two ways of absorption: through blood and through lymph. In 1821 he started the first journal dedicated to experimental physiology entitled *Journal de physiologie expérimentale*.²¹ In 1822 he published his most important discovery based on his animal experiments, that the ventral neural roots are motorical and the dorsal ones sensorical, which was also independently reached by the Scottish anatomist and vivisectionist opponent Charles Bell (1774-1842), based on his anatomical deductions, and which is today known as the Bell-Magendie Law.²²

His best pupil Claude Bernard (1813-1878), Professor at the Sorbonne in Paris and also a member of the Collège de France and Académie des Sciences, continued in the same fashion and even commented: 'The physiologist is not an ordinary man; he is a scientist, possessed and absorbed by the scientific idea that he pursues. He does not hear the cries of animals, he does not see their flowing blood, he sees nothing but his idea, and is aware of nothing but an organism that conceals from him the problem he is seeking to resolve'.²³ He explained the function of the pancreas, the existence of glycogen in the liver and muscles, the function of vasomotorical nerves and sympathetic system, the role of digestive ferments, the poisoning with carbon-dioxide, the method of causing artificial diabetes mellitus (*pique diabétique*), and formulated the terms *homeostasis* and *milieu intérieur*.²⁴ He claimed that all animals could be used in medical investigations, but advised the usage of the domestic ones due to their general accessibility, and preferred frogs.²⁵ His vivisectionist experiments aroused public outrage which resulted in the foundation of the French Anti-vivisectionist Society by the writer Victor Hugo and even made his wife and daughter to leave him.²⁶ In his book *Introduction à l'étude de la Médecine expérimentale*, published in 1865, he made a clear distinction between passive observations dominant in the pathological ward and active experimentation dominant in physiological laboratories.²⁷

²¹ Tubbs RS; Loukas M; Shoja MM; Shokouhi G; Oakes WJ. 'François Magendie (1783-1855) and His Contributions to the Foundations of Neuroscience and Neurosurgery'. *J Neurosurg.* 108-5; (2008): 1038-42.

²² Temkin O. 'The Philosophical Background of Magendie's Physiology'. *Bull Hist Med.* 20; (1946): 10-35.

²³ Škrobonja A; Muzur A; Rotschild V. *Povijest medicine za praktičare*. Rijeka: Adamić; 2003.

²⁴ Noble D. 'Claude Bernard, the First Systems Biologist, and the Future of Physiology'. *Exp Physiol.* 93-1; (2007): 16-26.

²⁵ Foster M. *Claude Bernard*. New York: Walsh; 1899.

²⁶ Holmes FL. *Claude Bernard and Animal Chemistry: the Emergence of a Scientist*. Cambridge, Massachusetts: Harvard University Press; 1974.

²⁷ Normandin S. Claude Bernard and An Introduction to the Study of Experimental Medicine: 'Physical Vitalism', Dialectic, and Epistemology'. *J Hist Med Allied Sci.* 62-4; (2007): 495-528.

Victorian Controversies

The 19th Britain century saw the polarisation of attitudes on the vivisectionist perception of animals as rightful victims of scientific progress on the one hand, and on the antivivisectionist perception of animals as unnecessary martyrs of scientific experiments on the other (hand). For example, while the British physicians James Blundell (1790-1878) and Marshall Hall (1790-1857) promoted the usefulness of vivisectionism in the development of science, the Quaker Preacher W. E. Forester and the Puritan Minister David Davis, despite their mutual religious differences, promoted antivivisectionism. The Anglican Buckingham Vicar Henry Crowe wrote philosophical tractates 'Zoophilos or Considerations on the Moral Treatment of Inferior Animals' and 'On Cruelty in Philosophical Researches' in which he equalled vivisection with inquisition. Debate even spread to the British Parliament where the Conservatives Sir Robert Peel and Sir James Mackintosh defended vivisectionism from the attacks of the Liberals Richard Martin (1754-1834) and Lord Erskine (1750-1823). The 'Martin's Act' which provided the sanctions against the cruelty towards the big domestic animals like horses and cattle was accepted in 1822, and was spread on all domestic animals in 1835, while the 'Animals Friends Society' was founded in 1824.²⁸

The above mentioned vivisectionist-antivivisectionist polarisation gave rise to a number of public controversies.²⁹ The first one involved the English physician A. P. Wilson Philp (1770-1847) who was accused of cruelty towards animals as a result of the persecution from his colleagues in the Royal Society. It was followed by a suit for cruelty towards animals raised by the English women tourists against the Italian physiologist Moritz Schiff (1823-1896) in Florence in 1863 and which was dismissed due to the nonexistence of the law which would prohibit the mentioned cruelty. Another controversy occurred in Norwich in 1874, when the French physiologist Eugene Macnan publicly demonstrated the alcohol causation of epilepsy on the dog to which he intravenously injected absinth. Although he as a foreigner had an immunity, his three assistants ended at court, but were liberated which only fuelled the discussion.³⁰

The biggest controversy occurred after the publication of the *Handbook for the Physiological Laboratory* in London in 1873, which was written by John Scott Burdon

²⁸ French RD. *Antivivisection and Medical Science in Victorian Society*. Princeton: Princeton University Press; 1975.

²⁹ Elton MA. 'Women and Antivivisection in Victorian England, 1870-1900'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London i New York: Routledge; 2007.

³⁰ Rupke NA. 'Pro-vivisection in England in the Early 1880s: Arguments and Motives'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London i New York: Routledge; 2007.

Sanderson (1828-1905), Professor of Practical Physiology at University College London, Michael Foster (1810-1880), Fellow and Praelector of Physiology at Trinity College Cambridge, Thomas Lauder Brunton (1844-1916), Lecturer on Materia Medica at the Medical College of Saint Bartholomew's Hospital London, and Edward Emanuel Klein (1844-1925), Assistant Professor at the Brown Institution London. Its publication followed after the series of lectures 'On the Propriety of Using the Lower Animals for the Purpose of Experimentation' given by Sanderson at the University College London. Although the *Handbook* was the first comprehensive text on physiology to be published in Britain, its scientific success was overshadowed by the public outrage over the animal vivisections described within in it. Sanderson and Klein received the greatest criticism from antivivisectionists because they conducted the majority of the painful experiments, which comprised 15% of all experiments described in the book, without any mention of using anaesthesia, despite the fact that ether and chloroform had been in use since the 1840s. For example, Klein described experiments on tadpoles, frogs, lizards, snakes, chickens, geese, ducks, rats, rabbits, guinea pigs, calves, pigs, sows, hedgehogs, cats, and dogs.³¹

In a response to public outrage, the Royal Commission on Vivisection for Scientific Purposes, presided over by Lord Cardwell, was established in 1875.³² Sanderson was questioned first on his experiments without the use of anaesthetics, or with the use of curare, and he stated that the book had always been intended for the professionals and not for the students. Foster claimed that his approach had always been intended to avoid pain. Brunton proved that he had used anaesthesia and had avoided the use of curare. Contrary to other authors, who were born and bred in Britain, Klein, being born into a German speaking Jewish family in Osijek in Croatia, and educated in Vienna in Austria, moved to London no sooner than 1871.³³ So being a foreigner, he undermined the role of the Commission, where he responded bluntly that he had no regard at all to the suffering of the animals and used anaesthetics only for convenience sake in order to avoid animal caused injuries and cries during student practices.

The mentioned testimony gave Klein the image of an arch-vivisectionist and exposed him to attacks of both the older generation of physicians who perceived medicine as an empirical, rather than experimental discipline with a purpose to educate gentlemen and not scientists, and the radical groups like suffragettes and socialists,

³¹ Burdon-Sanderson JS. (editor). *Handbook for the physiological laboratory*. London: Churchill; 1873.

³² Jesse GR. *Evidence, Given Before the Royal Commission on Vivisection*. Charleston: BiblioBazaar, LLC; 2008.

³³ Belicza B. 'Klein, Emanuel'. U Padovan I (urednik). *Medicinski Leksikon*. Zagreb: Leksikografski Zavod Miroslav Krleža; 1992.

united in the fear that human vivisections were the next step.^{34,35} His character even inspired the publication of three gothic novels, which described a new type of scientist portrayed as a hypnotist and a sadist of a German-Jewish origin, and declaring himself as an evolutionist and an atheist, which thus clearly reflected the British Victorian xenophobia.^{36,37,38,39,40}

As a result of the mentioned controversy, two societies were formed. The first one was the Victorian Street Society for the Protection of Animals Liable to Vivisection, which was formed by Frances Cobbe and Doctor Hogan in 1875 under the protection of the Queen Empress Victoria.⁴¹ Its membership comprised the Roman Catholic Archbishop of Westminster Henry Edward Cardinal Manning, the Archbishop of York William IX Thompson, The Lord Chief Justice of England Sir Alexander Cockburn, Prince Lucien Bonaparte of France, Princess Eugenie of Sweden, Alfred Lord Tennyson, Robert Browning, and John Ruskin. The second one was the Physiological Society, which was founded in 1876 with the aim of promoting experimental research.⁴² Its membership was consisted of Charles Darwin, Francis Maitland Balfour, Thomas Lauder Brunton, Francis Darwin, Michael Foster, Francis Galton, W. H. Gaskell, Thomas Henry Huxley, E. E. Klein, F. W. Pavy, Henry Power,

P. H. Pye-Smith, William Rutherford, Sir Edward Sharpey-Schafer, Gerald F. Yeo, and C. Yule.

Medical journals have also been divided with the *British Medical Journal* defending vivisectionism, and the *Lancet* propagating antivivisectionism, while the *Medical Times* and the *Gazette* chose *via media*. Political parties also chose sides with the Conservatives under Benjamin Disraeli in favour of vivisectionism and the Liberals under Lord Carnarvon in favour of antivivisectionism. The lasting outcome was the acceptance of the 1875 'Cruelty to Animals Act' which regulated further animal re-

³⁴ Richards S. 'Vicarious Suffering, Necessary Pain'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London i New York: Routledge; 2007.

³⁵ Richards S. 'Anaesthetics, Ethics, and Aesthetics – Vivisection in the Late 19th Century British Laboratory'. In: Cunningham A; Williams P (editors). *The Laboratory Revolution in Medicine*. Cambridge: Cambridge University Press; 1992.

³⁶ M.R.C.S. 'Twelve Years Trial of the Vivisection Act – Has it Stopped the Scientific Torture of Animals in England'. London: Swan Sonnenschein, Lowry and Co; 1889.

³⁷ MacDonald G. *Paul Faber, Surgeon*. London: Hurst and Blackett; 1878.

³⁸ Graham L. *The Professor's Wife*. London: Chatto and Windus; 1881.

³⁹ Collins W. *Heart and Science*. London: Chatto and Windus; 1883.

⁴⁰ Atalić B; et al. 'Emanuel Edward Klein-The Father of British Microbiology and the Case of the Animal Vivisection Controversy of 1875'. *Toxicologic Pathology* 37 (2009): 708-713.

⁴¹ Vyvyan J. *In Pity and in Anger – A Study of the Use of Animals in Science*. London: Michael Joseph; 1969.

⁴² Sharpey-Schafer E. 'History of the Physiological Society 1876 – 1926'. *Journal of Physiology* 64; (1927): 1-76.

search. It declared that vivisections could be performed only by persons holding a valid license issued by the Home Secretary. For special experiments, involving pain and without anaesthesia, special certificates with limited validity had to be obtained separately. As a reaction to its misuses, Frances Power Cobbe in 1898 founded the British Union for the Abolition of Vivisection, whose 90 % of membership were women, including two physicians: theosophist Anna Kingsford and suffragette Frances Hoggan. But it would be false to conclude that all suffragettes were also antivivisectionists. For example, American physician Mary Putnam Jacoby (1842-1906) openly advocated vivisectionism as a part of her suffragette activities in order to show that she is equal to male physicians in all respects, including animal experiments.

Edwardian Struggles

Britain remained the main stage of the vivisectionist-antivivisectionist struggles during the beginning of the 20th century. The main event was the 'brown dog affair'. It occurred in 1903 after the two Swedish ex-medicine students and antivivisection activists, Louise Lind-af-Hageby and Leisa Schartau, witnessed the experiment on the old brown dog of terrier type conducted by William Bayliss, an Assistant Professor of Physiology at the University College London, in front of 70 students. The dog had two wounds from the previous experiments conducted by Professor Ernest Starling and had its neck opened without proper anaesthesia in order to expose his salivary glands to electrical stimulation, which was both conducted against the 1875 'Cruelty to Animals Act'. In the end, experiment failed and the dog was killed by the unlicensed researched student Henry Dale by thrusting the knife in his heart, but only after his pancreas was already taken out for microscopically examination. It prompted Stephen Coleridge, a barrister and a member of the National Vivisectionist Society, to publicly attack Bayliss for breaking the 1875 'Cruelty to Animals Act' on the grounds that the dog was previously twice operated and that during the procedure no anaesthesia was used. Bayliss requested a full apology, which Coleridge ignored, and the affair ended up at the High Court in the London Strand. Because there was no other evidence except the two witness accounts, Bayliss won and Coleridge lost to pay 3000 GBP of court costs and 2000 GBP to Bayliss, which he used for the promotion of physiological research.⁴³

The mentioned court decision motivated antivivisectionist activist Louisa Woodward to initiate building of a drinking fountain with the sculpture of the brown dog

⁴³ Lansbury C. *The Old Brown Dog – Women, Workers, and Vivisection in Edwardian England*. Madison: The University of Wisconsin Press; 1985.

dedicated to 232 dogs vivisected at the University College London during 1902. Battersea Park in South London was chosen as the location of the sculpture due to its Progressive city council government. The monument was opened on the 15th September 1906, which the University College Students perceived as a provocation. They tried to remove it on the 20th November 1907, but failed to do it, which ended up with ten of them getting arrested by two policemen and sentenced to pay 5 GBP for the fine and 10 shillings for the damage. They gave it another try on the 10th December 1907 with the help of the Oxbridge students after the annual Varsity rugby match, but were outnumbered by the police and antivivisectionist public composed of different oppressed groups such as suffragettes, unionists, socialists, radicals and the Irish Home Rulers. Afterwards, the monument was constantly guarded by two policemen during the day and four policemen during the night which cost 700 GBP per year (60,000 current GBP). In addition, three pro-brown dog mass meetings were organised during 1908, which made newspapers to declare the dog victorious. But everything changed in 1909 when the Reformers won the city council elections and decided to move the monument despite the antivivisectionist protests. It was finally completely destroyed and 300 GBP with interests were returned to Louisa Woodward. When the Progressives reclaimed the power in 1912 they decided to avoid conflicts and put the simple fountain in its place. But the episode was reacted almost 80 years later, when on the 12th December 1985 during the Labour city council government the antivivisectionist and an actor Geraldine James, unveiled the new brown doge memorial in the Battersea Park, which was then later moved and sent to restoration by the Conservatives in 1992, only to be returned again in the back corner by the Labours in 1994.⁴⁴

The 20th Century

The 20th century saw the spread of vivisectionism and the decline of antivivisectionism. One reason for it was the vivisectionist scientific foundation of the medical profession and its consequent medical benefits for the general population. Another one were the social changes which caused the loss of nobility and clergy influence who were the main agitators of antivivisectionism. Important role was also played by the good vivisectionist promotion such as posters showing a new-born, and asking a viewer a question whom would he/she rather save: his/her child or a laboratory animal. The mentioned shift had its reflection in the Final Report of the Second Royal Commission, which took six years to be written, from 1906 to 1912, and in

⁴⁴ Mason P. *The Brown Dog Affair – the Story of a Monument the Divided the Nation*. London: Two Seven Publishing; 1997.

the end declared that there was no reason for further restrictions of animal experiments. The major blow to the antivivisectionist movement was its schism which occurred in July 1909 when the two international congresses were independently organised in London. The first one, organised by the above mentioned Louise Lind-af-Hageby, aimed at the step by step constriction of animal experiments, while the second one, organised by the World League against Vivisection, demanded the immediate abolition of animal experiments. Although the difference between the two groups was tactical and not doctrinal, their division became permanent reality.⁴⁵

One could argue whether the above mentioned rise of vivisectionism and split of antivivisectionism had made a way for the recurrence of experiments on humans. The first one occurred during the First World War on the 22nd April 1915, when the German army threw chlorine gas into the French trenches in Ypres in order to test its effectivity, which was subsequently repeated by both war parties with different gases on different occasions. Among various experiments on humans, the ones connected with syphilis deserve special attention. Between 1930 and 1972, the USA Ministry of Health conducted the secret 'Tuskegee Syphilis Study' on the couple of hundreds untreated, poor and uneducated African Americans, in order to study the natural development of syphilis, and despite the fact that penicillin was in use since 1946. In this context it should be mentioned that the first cure for syphilis, salvarsan, was also tested on the uninformed patients by its founder Paul Erlich during the 1910. The worst experiments on humans were conducted during the Second World War by the Nazi physicians: Mengele (Kaiser Wilhelm Institute for Anthropology, Human Genetics and Eugenics in Berlin), Rose (Robert Koch Institute), Rostock (University of Berlin), Sievers (Reich Research Council), Gebhardt (German Red Cross), Brandt and Conti (Public Health and State Hygiene) on the prisoners in Auschwitz, Buchenwald, Dachau and other concentration camps. The experiments included the low pressure chamber exposure in order to study the adaption to high heights useful in aviation, the immersion into cold water in order to produce suitable clothes for the soldier fighting in Russia, and the artificial infection and consequent infection of various wounds in order to test sulphonamides. They all had in common the fact that they happened continuously and simultaneously with the animal experiments and under the official explanation that the conditions were more natural in human than in animal experiments.⁴⁶

The above mentioned experiments on humans prompted the international adoption of the Nuremberg Code (1946) and the Helsinki Declaration (1946), which sen-

⁴⁵ Vyvyan J. *The Dark Face of Science*. London: Michael Joseph; 1971.

⁴⁶ Ibid.

tenced their proponents, prohibited further involuntary human experiments, and regulated voluntary human experiments. They had their reflection in the subsequent adoption of the Geneva International Guidelines (1985) and the Hong Kong Resolution (1989) which restricted the use of animals in biomedical researches. According to them *in vivo*, animal experiments are now regulated according to the 3R principle: replacement with other possible experiments, reduction of number of animals, and refinement of experimental protocols. However, they still remain the middle step between tissue cultures and clinical experiments. Each year results show that out of 18-22 millions of animals killed in the USA 85 % are rats, mice and birds, and the 3 millions of animals killed in the UK 80 % are rats and mice, 10 % other rodents, birds and fish, and 1 % dogs, cats and primates.⁴⁷ Such a large number of sacrificed animals has its counterpart in the occasional terrorist treats to biomedical research laboratories by animal rights fighters.⁴⁸ The main arena of contemporary vivisectionist-antivivisectionist struggles have become various scientific journals and popular books, such as the Princeton philosopher Peter Singer's *Animal Liberation* in which he restated the above mentioned utilitarian notion that animals deserve their dignity based on their sense of pain and despite their lack of reason and speech, because as he argues in the later case the same dignity should be withdrawn from unborn babies, mentally retarded and senile elders.⁴⁹

Conclusion

This review tried to present the historical development and ethical considerations of vivisectionist and antivivisectionist movement in order to evaluate the accepted notions of the earlier authors. In this respect, it corrected the French black and white notion that the antivivisectionists had no regard towards animals, while the vivisectionists had profound feelings towards them, because the main proponent of the 1875 animal controversy Emanuel Edward Klein was generally fond of dogs,⁵⁰ while the founder of the Victorian Street Society Frances Power Cobbe was regularly practising fox hunting.⁵¹ It also characterised as an oversimplification the Mason's no-

⁴⁷ Radačić I. 'Propisi o zaštiti životinja za pokuse i druga znanstvena istraživanja'. In: Radačić M, Bašić I, Eljuga D. *Pokusni modeli u biomedicini*. Zagreb: Medicinska naklada; 2000.

⁴⁸ Cressey D. 'Proposed Animal Research Reforms Spark Concern in Europe'. *Nat Med*. 10/1038; (2008): 1208-1293.

⁴⁹ Singer P. *Animal Liberation*. New York: Ecco; 1975.

⁵⁰ Andrewes FW. In Memoriam – Edward Emanuel Klein, MD, FRS. *St Bart's Hosp R*. 58; (1925): 1-6.

⁵¹ Richards S. 'Anaesthetics, Ethics, and Aesthetics – Vivisection in the Late 19th Century British Laboratory'. In: Cunningham A; Williams P (editors). *The Laboratory Revolution in Medicine*. Cambridge: Cambridge University Press; 1992.

tion that suffragettes were naturally antivivisectionists, because the example of the American physician Mary Putnam Jacoby, who was at the same time a suffragette proponent and a vivisectionist activist, clearly refutes it.⁵² On this track, it corrected the Lansbury's biased notion that antivivisectionism was something characteristic for the North European Protestant countries like England and Sweden, while vivisectionism was something characteristic for the South European Catholic countries like France and Italy, because the membership of the English Catholic Archbishop of Westminster Henry Edward Cardinal Manning and the French Catholic Prince Lucien Bonaparte of France in the Victorian Street Society, together with the 18th century written debate between the English Catholic poet and antivivisectionist Alexander Pope and the English Protestant minister and vivisectionist Stephen Hales puts it into a question.⁵³ Finally, it showed that the antivivisectionist movement has not failed by not achieving the complete abolishment all vivisectionist activity, because it has managed to restrict it with various regulations such as the recent European Union Guidelines.⁵⁴

This paper is composed on the basis of the author's doctoral thesis entitled 'Važnost eksperimentalizma Emanuela Edwarda Kleina za razvoj temeljnih medicinskih znanosti' which was written under the mentorship of Professor Ana Borovečki

⁵² Bittel C. 'Science, Suffrage, and Experimentation: Mary Putnam Jacobi and the Controversy over Vivisection in Late Nineteenth-Century America'. *Bull.Hist.Med.* 79; (2005): 664-694.

⁵³ Richards S. 'Vicarious Suffering, Necessary Pain'. In: Rupke NA (editor). *Vivisection in Historical Perspective*. London i New York: Routledge; 2007.

⁵⁴ *Appendix A of the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes and Guidelines for Accommodation and Care of Animals Approved by the Multilateral Consultation*. Strasbourg: Cons 123 – 3; 15 June 2006.