

Review articles

Professors Rudolf Weigl and Ludwik Hirszfeld – in the meanders of History

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ABSTRACT. The lives and scientific achievements of two outstanding Polish biologists – Professors Rudolf Weigl (1883–1957) and Ludwik Hirszfeld (1884–1954) – are presented in the context of the social and political events before and after World War II. The main aim is to recall and emphasise the very modern studies conducted in the two decades between the wars in the Polish scientific centres of Lvov and Warsaw, and the resulting concepts which provided the basis for both the modern microbiological-parasitological experiments and the organisation of post-war teaching and research institutions in Poland. An attempt is made at analysing the effect of scientific paradigms from the boundary of the 19th and 20th centuries on the activity and attitudes of the two outstanding scientists. Their fates coincided in the dramatic war circumstances. Attention is drawn to human and extra-human factors which determined their very different fates in the last, post-war period of their lives. In August 1945 Prof. L. Hirszfeld moved from Lublin to Wrocław where he became famous as the first Dean of the Faculty of Medicine of Wrocław University and the founder of the Institute of Immunology and Experimental Therapy of the Polish Academy of Sciences. At the same time the Weigl Institute in Lvov, world famous for production of the first anti-typhoid vaccine, was never reconstructed in the post-war Poland, and the full scientific potential of the vaccine's inventor remained unrealised in the university circles of Cracow and Poznań, where Weigl was Professor of biology departments.

Key words: Rudolf Weigl, Ludwik Hirszfeld, anti-typhoid vaccine, Weigl reaction, blood types, immunology

Introduction

During the first Polish „Vectors and pathogens – past and future” conference, organised in 2011 by the Wrocław divisions of the Polish Society of Microbiologists and the Polish Parasitological Society at the Institute of Genetics and Microbiology of Wrocław University¹, the large lecture theatre was named after Professor Rudolf Weigl (1883–1957), the inventor of the first effective vaccine against typhus and a character regrettably forgotten not only among parasitologists. As observed by Danuta Nespiak [1] „*Medicine students know nothing about the world fame of the*

biologist who was close to getting the Nobel Prize and who during the German occupation of Lvov saved dozens of Polish professors, students and schoolchildren, including many members of the Home Army. However, I think that when asked who and what they associate with the «Schindler List», they would give an adequate answer; because young Polish intellectuals know who Schindler was but have no idea who Weigl was».

In the context of the conference presentations on pathogenicity of various microorganisms transmitted by different vectors, including parasitic arthropods, and in the light of modern studies, an attempt was made to recall and emphasise the role

¹See: Przegląd Uniwersytecki (Wrocław), R.17 Nr 12 (185), December 2011 (www.bibliotekacyfrowa.pl)

of outstanding scientists who made significant contributions to the development of Microbiology and Parasitology, creating new directions of research. The group of world-famous scientists who constituted the intellectual elite in Poland before and after the war included, besides Rudolf Weigl and many others, also professor Ludwik Hirszfeld (1884–1954) – a physician, bacteriologist and a serologist and who was especially meritorious for the Wrocław scientific centre. The Ludwik Hirszfeld Institute of Immunology and Experimental Therapy of the Polish Academy of Sciences, established by him in 1952, is located in Wrocław, Rudolf Weigl street 12; an obelisk commemorating professor R. Weigl, unveiled on the 8th of December 2005, is within its premises.

A historiographic picture of the two great biologists reveals their completely different fates in the last, post-war period of their lives. In 1945, Prof. L. Hirszfeld moved from Lublin, where he had taken part in establishing the Maria Skłodowska-Curie University, to Wrocław, where he gained employment at the Medical Faculty of Wrocław University. Posterity gratefully remembers him as the first Dean, and first of all as the founder of the above-mentioned Institute of Immunology and Experimental Therapy which now employs over 200 people, including 70 research staff. However, the Weigl Institute in Lvov, famous throughout the country, and indeed, the world, during the inter-war two decades, was never re-created in the post-war Poland, despite the plans made in Poznań and Cracow. This was a result of his falling into disgrace with both the authorities and the scientific circles.

This article is an attempt at presenting the various human and extra-human factors, as well as the circumstances, which decided about the such different development and continuation of advanced and original – in those times – scientific thoughts.

Before and after World Wars I and II

The life and achievements of Prof. **Rudolf Stefan Jan Weigl** have been summarised in a classical way by many of his Lvov co-workers [2], especially the laboratory staff who worked at the Typhus Institute at the Jan Kazimierz University, before and during World War II and after the war by professors of native and foreign universities, among others Cieszyński [3,4], Gaertner [5], Kryński [6–10], Stuchly [11], Szybalski [12] and Złotorzycka [13]. These and other commemorative



Phot. 1. Professor Rudolf Weigl; Lvov, 1938 (on left)



Phot. 2. Professor Rudolf Weigl; Lvov, 1938 (with Prof. Charles Nicolle and Prof. Helen Sparrow from Pasteur Institute in Tunis).

Phot. 1 and 2. Source: Copyright 2003 Muzeum Narodowe Ziemi Przemyskiej. Photos from originals by Stanisław Kosiedowski.

articles, whose titles and contents were sometimes very emotional [14], contain descriptions of circumstances which make it possible to reconstruct a picture of the scientist in defined socio-cultural and personal conditions, as well as in very dramatic political situations. At the same time we are attempting to answer, from the point of view of the so called Anthropology of Science, the many questions posed by the Science historians, philosopher Dr Adam F. Kola [15] and Dr hab. Bożena Płonka-Syroka, in their extensive lecture „*Rudolf Weigl – an unfinished biography*”, which was presented during the above mentioned 2011 Wrocław conference. The questions concern, among other things, the lack of post-war contact between the two professors, and most of all between Prof. Weigl and the Lvov scientists, including those

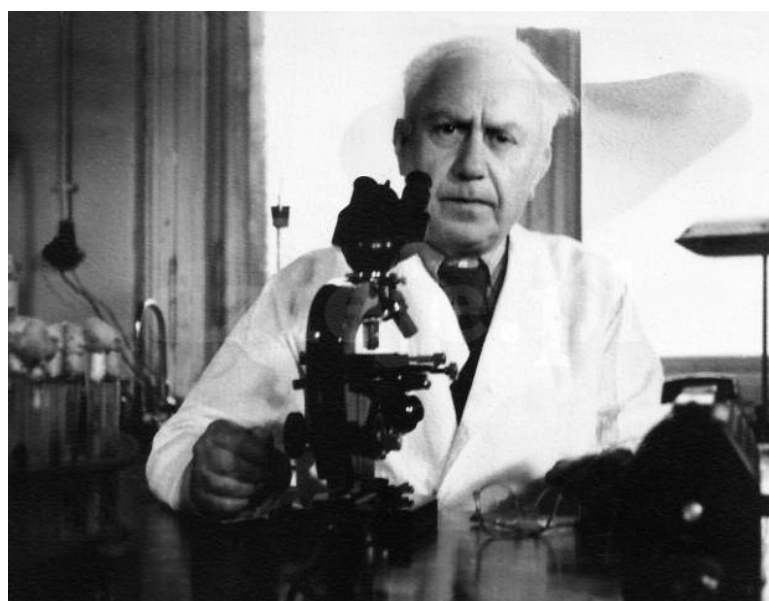
associated with the Typhus Institute, who organised the scientific life in Wrocław from the very beginning.

Rudolf Weigl, born in 1883 in Prerov in Moravia, in the multinational Habsburg Monarchy, Austro-Hungarian Empire, to a family of German-Austrian extraction², was a Pole by choice. This was associated with the second marriage of his mother Elsa Weigl née Kroesel, widowed in 1887, and his Polish step-father. Józef Trojnar, a teacher in Jasło and other district towns, and then director of the grammar school in Stryj, where Weigl passed his school-leaving exam in 1903, instilled in him a love of Science and Polish patriotism. Weigl, being interested in Science and especially in Biology, entered the Jan Kazimierz University in Lvov with which he remained associated for the next 40 years. In 1907, having obtained his master's degree in Natural History at the Faculty of Philosophy, he became assistant to Prof. Józef Nusbaum-Hilarowicz³ at the Chair of Zoology, under whose supervision, he was awarded the title of Doctor of Philosophy (1908) based on the dissertation „Studies on the Golgi-Kopsch apparatus and Holmgren trophosphonges in vertebrate neurons” and then his habilitation within Zoology, Comparative Anatomy and Histology (1913). As Professor Ordinarius, in 1920 he became head of the Department of General Biology at the Medical Faculty, where earlier (since 1918) he had been an assistant at the Chair of Histology and Embryology.

Rudolf Weigl's contemporary, **Ludwik Hirszfeld**, was born on August 5th 1884 in Warsaw to a Jewish family. The family were closely integrated into the Polish community, were of great merit for the Polish culture and actively participated in the underground patriotic and national independence activities of the time. Since childhood, Ludwik was brought up in an atmosphere of love and devotion to Poland. In 1902, he graduated from a grammar school for the humanities in Łódź and, like many young Poles, went to study Medicine in Germany. Initially he studied at Würzburg University, and then in Berlin. In 1907, aged 23, he obtained the title of Doctor of Medicine and Surgery based on his dissertation „Studies on blood agglutination and its physical bases”, published in German in the *Archiv für Hygiene* [16]. Professor Max Rubner evaluated the



Phot. 3. Professor Ludwik Hirszfeld (source: Internet n-equals-one.com)



Phot. 4. Professor Ludwik Hirszfeld (from archive of Joanna Kielbasińska-Belin)

dissertation as *eximia cum laude*. In the same year, Hirszfeld started his practice at the Cancer Research Institute in Heidelberg, where initially he worked in the Parasitology department and then at the Serology department. The head of the serological division of the department was the already famous Prof. Emil von Dungern, aged 43. Hirszfeld and Dungern conducted experiments on haemagglutination using dogs as experimental animals, and on this basis distinguished four blood groups. Their symbols O, A, B and AB were accepted world-wide in 1928. The two scientists created the basis of the science of blood typing and established the

² From the parish books: born on September 2nd 1883 in the town of Preroviae (Prerov), House No, 726, baptism date September 13th 1883, names: Rudolphus, Stephanus, Joannes. Father Fredericus Weigl, mother Elsa née Kroesel [1].

³ Józef Nusbaum-Hilarowicz (1859–1917) – a world-famous biologist: zoologist, evolutionist and propagator of Darwinism, author of numerous papers and textbooks.

terminology which is still valid today. They hypothesised that the character of the blood groups is individual, but evolved during the phylogeny of *Homo sapiens* [17]. Hirszfeld and his wife Hanna, also a physician, undertook studies on the distribution of blood types among various races and nations, thus creating the foundations of Seroanthropology. In 1911–1914 Ludwik Hirszfeld worked at the Department of Hygiene of Zurich University. There he became habilitated at the age of 30 and later regarded as a scientist endowed with exceptional knowledge and intuition. During that period, he made important discoveries regarding the causes of goitre in humans, despite this being, in a sense, on the margin of immunology and serology, his key scientific interests. At the beginning of World War I, in February 1915, having received news of the spotted fever epidemics, Hirszfeld rushed with help to Serbia [18]. He organised a laboratory in Saloniki, conducted vaccination programmes and fought the epidemics of spotted fever, typhoid fever and malaria. Even there he did not stop his research work. He found that the strain of typhus bacilli, named by him *Salmonella paratyphi C*, and later named for him *Salmonella hirszfeldi*, was an important etiological factor of typhoid, and may be the cause of epidemics.

World War I, as well as epidemics, especially of spotted fever, which usually accompanies wars, disasters and famine, played a significant part in the lives and scientific choices of the two scientists. Spotted fever⁴, known to be transmitted by body lice, at present has no greater epidemiological significance, but in the past, until the second half of the 20th century, it was the cause of the deaths of millions of people. During World War I in Serbia, the greatest typhus epidemics which Ludwik Hirszfeld and his wife Hanna helped to fight, killed about 150 thousand people. In the first year of the war, Prof. Rudolf Weigl was mobilized to the Austrian army and assigned to the bacteriological laboratory of Filip Eisenberg (1876–1942), an army surgeon at that time. Following microbiological training in Vienna, he started working in prisoner of war camps in Moravia. In only the first year of the war, typhus epidemics affected more than 120

thousand soldiers in the Austrian army; half of them died. In Russia in 1917–1921, about 25 million people were infected and several millions died [11]. Epidemics broke out with special intensity in winter when the lice reproduced in the underwear of front line soldiers, which was not changed, forcing the state authorities to spend considerable funds on anti-epidemic measures in 1916.

In his subsidised research, Weigl made use of the current knowledge of typhus. Already in 1909, a French biologist Charles Nicolle (1866–1936) had recognised the role of lice as biological transmitters (vectors) of typhus, for which in 1928 he was awarded the Nobel prize [19]. However, the discovery of the etiological factor, that is the typhus germ, took place as late as 1916, in the well known Institute of Tropical Medicine in Hamburg. The Brazilian researcher Henrique da Rocha-Lima (1879–1956) working there, who had obtained his physician's diploma in 1905 at the Medical School in Rio de Janeiro, identified bacilliform, intracellular, Gram-negative microorganisms isolated from louse intestines. He named them *Rickettsia prowazekii* in honour of the scientists who died during their studies on typhus: Howard Taylor Ricketts (1871–1910), an American bacteriologist, and an Austrian zoologist and parasitologist of Czech extraction, Stanislav von Prowazek (1875–1915), with whom da Rocha-Lima fought the epidemics in Serbia at the beginning of the war; later also together they treated Russian prisoners of war in German hospitals.

As already mentioned, Rudolf Weigl, on the basis of Ch. Nicolle's⁵ results published in 1910, was commissioned by the Austrian military authorities to conduct parasitological and bacteriological research during World War I in camps for refugees with typhus, and in military bacteriological laboratories in Tarnów and then in Przemyśl. There, in 1918, he became head of a laboratory which was created especially for him, and in 1919, head of the Laboratory of Typhus Studies at the Military Sanitary Council. In 1920 in Lvov, within the Department of General Biology, Jan Kazimierz University, Weigl's Institute of Studies on Typhus and Viruses⁶ was established,

⁴ Weigl in his papers used the term rash typhoid. In 1918 the epidemics of typhus occurred in Central-Eastern Europe along with the epidemics of influenza which was then called Spanish influenza.

⁵ In 1936 Prof. Ch. Nicolle visited Weigl's department; for several months Weigl hosted also Dr Chang from Beijing University, who then started production of the vaccine in China; a representative of Vatican who was interested in vaccination in the missions of Far East, as well as many scientists from Czechoslovakia, Germany, Italy, Romania, Palestine, Morocco and Texas [13].

⁶ Between the wars Prof. Weigl's laboratory, laboratories of his co-workers, offices, production departments and animal pens were located in the area between the old University building and the church in Św. Mikołaja street; during the first Soviet occupation of Lvov (22 September 1939–29 June 1941) the former Królowej Jadwigi girls' grammar school, 25 Potockiego street, was adapted for the needs of vaccine production.

where production of the first effective vaccine against spotted fever was started. The vaccine was composed of rickettsia suspension in physiological solution, with addition of 0.5 ml of phenol [12]. It saved the lives of millions of people. Also, thanks to the vaccine, scientists in all laboratories could safely conduct research on the disease which had caused the deaths of numerous scientists and physicians; Weigl himself contracted typhus in the laboratory twice. The typhus research developed in three directions: microbiological, serological and epidemiological.

In the period between the wars, Weigl organised 23 research institutes in Poland and abroad, dealing with typhus research. After the war, about 80 of his co-workers of that period were employed as Professors both at home and abroad [20]. Weigl presented his research results at numerous scientific conferences within the country, and also during invited lectures in international scientific institutions in Geneva, Paris and Stockholm. In 1936, he was proposed by the Swedish Academy of Sciences as a candidate for the Nobel Prize which, however, he was never awarded⁷. Weigl's research was appreciated in the Vatican: he was made a Knight of the Order of St Gregory, with the title of Camerlingo, for the successful vaccination against typhus in the Belgian catholic missions in China; he was also awarded other distinctions: Belgian Leopold Order of class III for his outstanding merits for typhus control in the colonial parts of Africa and honorary membership of the Belgian Royal Academy of Sciences. Weigl was also a lifelong member of the New York Academy of Sciences; since 1930, a member of the Polish Academy of Arts and Sciences and of many other native societies, and after World War II, of the Polish Parasitological Society. His work in Lvov in 1920-1939 brought him well-deserved recognition in Poland; he was awarded the Commander Cross of Polonia Restituta, Commandery of Polonia Restituta, and a financial award by the president of the city of Lvov.

Prof. Weigl's merits for Science include not only the vaccine whose scientific and technical bases, as well as the difficulties of louse culture, louse infection (*per rectum*) and multiplication of

Rickettsia prowazekii in louse intestinal cells, dissection and obtaining biological material have been described in detail by the professor's co-workers, post-war Professors of Microbiology and Parasitology, but most of all for recognising insects as potential experimental organisms [12,14–21]. The idea of using an aseptic environment, louse intestinal cells, for microorganism culture opened the road to contemporary techniques of virus culture. At present, many arthropod species are also used in in vitro microbiological-parasitological studies in the Wrocław Department of Parasitology. In 2007, the Department of Ecology and Environment Protection, oriented for research on parasitic arthropods as vectors of pathogens and objects of microbiological control, budded off from the Department of Parasitology [22]. Later, cultures on bird embryos and isolated tissues were introduced in virology but, according to Kryński [8] „we should not forget that the first such idea was Weigl's. Regretfully, even in Poland nobody remembers it”. Moreover, Weigl devised the diagnostic method of microserological differentiation which made it possible to distinguish not only between strains of rickettsiae and other microorganisms, but also to assess the possible resistance of the studied organisms through determining the agglutination titre. It is the so called Weigl reaction, and the name was introduced by Ch. Nicolle in honour of the Polish scientist. Weigl's earlier zoological research on the Golgi apparatus which demonstrated the common occurrence of this structure in the cells of metazoans, and experiments on transplantation and the mechanism of amphibian metamorphosis, also place him among the leading scientists. As noted by Prof. Kryński [10], nearly 90% of Weigl's research results, including technical improvements, were only communicated verbally. Attempts at summarising them in written form made by Kryński and Dr A. Herzig after the professor's death were unsuccessful.

When Poland regained independence, **Professor L. Hirszfeld** returned to Warsaw in 1919, after seventeen years abroad. He became head of the Department of Serum Research as a mature and renowned specialist [18]. In 1926, he habilitated for the second time, as a bacteriologist and

⁷Most publications emphasise the fact that Prof. R. Weigl was closely missed being awarded the Nobel Prize as many as 4 times: in 1922 when the professor, known for his modesty, himself regarded his results as too insignificant; in 1936 when he was not awarded the prize despite the nomination of the Swedish Academy, because of too little involvement on the part of the Polish government, since already in 1928 prize for typhus discoveries had been awarded to Ch. Nicolle; in 1942 the professor refused to become a Reichsdeutsch and this was the condition of getting the prize; in 1948 he failed to be awarded the prize because of the refusal of support by the PRL government, whose actual reason for lack of support was the rejection of Jarosław Iwaszkiewicz as a candidate for the literary prize by the Nobel Committee [28].

immunologist, at Warsaw University, where in 1931 he became Professor. In the two decades between the wars (1926–1939) he was director of the Division of Bacteriology and Experimental Medicine of the State Department of Hygiene (PZH). At that time he was very active scientifically and as an organiser. He was one of the organisers of the Polish Bacteriological Society and the Society of Prophylactic Medicine; within the framework of the activities of these societies he organised actions of anti-diphtheria and anti-scarlet fever vaccinations in Poland. His activities included the organisation of blood donor centres. Besides this, he conducted comprehensive studies which lay on the boundary between Serology and Anthropology, known as „constitutional serology” [17,23]. He dealt with the serological properties of neoplastic and tuberculous tissues; in demonstrating the distinct character of these tissues, he opened new research possibilities in the studies on these diseases. Prof. Hirszfeld’s active participation in the work of numerous international scientific societies and conferences during the period between the wars is worth noting: inter alia regular meetings of the Hygiene Committee of the League of Nations, Anthropological Conference in Amsterdam (1928), Blood Transfusion Conference in Rome (1935), International Physicians’ Congress in Paris (1937), or Conference of General Pathology in Rome (1939). At the same time, Professor Hirszfeld started immunology lectures at the Free University of Poland, and later at Warsaw University and the Hygiene School in Warsaw. He gave topical lectures and organised courses even in the hell that was the Warsaw ghetto, where he was forced to live during World War II. Striving to create scientific foundations for the fight for human health was characteristic of Prof. Hirszfeld also in the tragic days of the Warsaw ghetto, when great epidemics of spotted fever were decimating the population. He became president of the Health Council, organised a bacteriological laboratory and conducted vaccinations in the Warsaw ghetto.

The fates of the two great scientists intersected with those of other Poles during that tragic period in the history of Poland. In 1942 it

was directly to professor Ludwik Hirszfeld in the Warsaw ghetto that Prof. Weigl sent his co-worker, Dr Henryk Mosing, who described the events in his autobiography [18] *„Professor Weigl sent large quantities of typhus vaccine from Lvov and the State Department of Hygiene, addressed to me. On free market each portion of the vaccine was about one thousand zloties. I handed over the vaccine to the Health Council, on the condition that the patients would pay only a small price. In this way a fund at disposal of the Health Council was formed.”* (pp. 326-327), and a few pages further (329)... *„Typhus is raging in the district; we are using vaccines sent to us in secret by the great scientist, professor Weigl and the Department of Hygiene. Besides, very expensive vaccines are available on the market. The International Red Cross sent vaccines from lungs of infected animals, demanding that I should supervise testing them.”*

The patriotic and humane attitude of Prof. Weigl during World War II is at present little known even in the academic circles. During the Soviet occupation, it was expressed by his refusal to accept academic titles and the post of director in the Soviet Academy of Sciences in Moscow. During the German occupation (1941–1944), it was a categorical „no” to the proposal of becoming a Reichsdeutsch, evacuation to Berlin and the prospect of directorship in the specially established institute, as well as becoming a candidate for the Nobel prize. Successfully defending the staff against the Nazi party was no less important; today the number of such persons is estimated as a few thousand, mainly representatives of the intelligentsia: scientists, cultural representatives and members of the resistance movement, intellectuals deprived of means of subsistence. This has been very thoroughly documented in all the cited articles and memoirs of many scientists: Prof. Alfred Jahn (1915–1999), director of the Institute of Geography, Wrocław University for many years, vice-rector (1959–1962) and rector (1962–1968)⁸, in his book *„From Kleparów into the wide world”* [24] recalls that *„Nearly all Lvov University worked for Weigl. When I was feeding the lice, a famous Lviv psychologist Kreutz sat next to me, and nearby I saw*

⁸ It is worth mentioning that the Wrocław scientists employed at the Institute and thus protected against the occupants’ repressions included also Prof. Stanisław Kulczyński (1895–1975), the first rector of Wrocław University (1945–1951); Dr Edward Zubik (1907–2000), head of the Chair of Animal Physiology and Dean of the Faculty of Natural Sciences of Wrocław University; Seweryn Krzemieniewski and his wife Helena Krzemieniewska (1878–1966), who as Professor and Head of the Department of Plant Physiology of Wrocław University in 1946–1951 was a Microbiology lecturer; she was also an honorary member of the Polish Microbiological Society, and her biogram was presented by Prof. W. Kunicki-Goldfinger in the *Postępy Mikrobiologii* 1966, 5: 142.

the famous mathematician professor Banach". The published list of names of 512 institute staff⁹, includes the name of Przemysław Rybka, then astronomy student at UJK, later docent at Wrocław University, and privately brother of Prof. Jadwiga Złotorzycka, head of the Parasitology Department of Wrocław University for many years [22]. Prof. Złotorzycka, then a secondary school student, worked at the Institute for more than one and a half year as lice feeder [13]. During our long collaboration when preparing parasitological textbooks, she mentioned repeatedly what a treasure, often life-saving, was the Weigl-invented German identity card „Ausweis” printed on forms of the „Oberkommando der Wehrmacht” with the inscription „Institut für Fleckfieber- und Virusforschung des Oberkommando des Heeres”. The Germans were very afraid of epidemics, especially typhus. As a result, they let Weigl choose his own staff. The card made it possible for the owner to move freely at all times, also within underground activities¹⁰, it was protection during various police raids, such as street round-ups; the employees' food allowance made it possible to survive [25]. Weigl had the courage to employ even Jews in his Institute¹¹ – thanks to him, Dr Henryk Meisel and his wife Paula survived. He also wanted to employ and save his Microbiology teacher Prof. Filip Eisenberg, an outstanding Krakow bacteriologist. He sent Dr Stuchly to him [11] but Prof. Eisenberg decided to hide in his own flat; put into the ghetto, he later died in the Bełżec concentration camp. The Institute was engaged in its own underground activity, providing best quality vaccine to prisons, concentration camps¹² in Auschwitz and Majdanek, partisan squads and ghettos, including the Warsaw ghetto which Prof. Hirszfeld left the day before its liquidation.

After the liberation of Lublin, in 1944, L. Hirszfeld became professor of the Maria Curie-Skłodowska University in Lublin (UMCS). On the first of August 1945 he moved to Wrocław where he started organising, as an academic teacher, the

Medical Faculty of the University and Polytechnic. He was the first Dean and already on the 6th of September 1945 had his first lecture at the Faculty: „New trends in Bacteriology”; he organised the Department of Medical Microbiology and remained its head till his death in 1954. The Department was built from ruins, but in a few years it had become a scientific institution of world significance. Hirszfeld's research plans included both problems to which he had been true since the beginning of his scientific career, and new topics, often in collaboration with foreign scientists [22]. Many of them were to meet the demands of the first post-war years: studies on the serology of syphilis, cancer diseases and immunological problems, as well as pregnancy pathologies and serological conflict, including pioneer research on the Rh factor. Prof. Hirszfeld was the first (1925) to propose the hypothesis that serological differences between maternal and foetal blood could cause foetus damage, and to create the theory of heterospecific pregnancy and serological conflict. A significant consequence of his studies on serological conflict was the first transfusion of blood through the umbilical vein in a neonate with Rh serological-conflict-based haemolytic disease, conducted in 1949 in Wrocław by Prof. K. Jabłoński (1905–2004). It was a unique procedure, and a first for the world; since then such transfusions have been performed to save the lives of neonates in many hospitals. The Centre of Studies on Pregnancy Pathology in Wrocław, one of the first such centres in the world, was established on Prof. Hirszfeld's initiative.

Ludwik Hirszfeld's merits were appreciated by the scientific circles. In 1950 he was awarded the title of Doctor Honoris Causa at the Charles University in Prague, and one year later, at Zurich University. The Professor was a full member of the Polish Academy of Sciences, a member of the Presidium of the Polish Academy of Sciences, and also vice-president of the Wrocław Scientific Society. Besides this, he actively participated in the

⁹ Alphabetical list of people employed at the Weigl Institute and professions of some of them after World War II follow the publication from the Polish session „Profesor dr Rudolf Weigl i działalność jego Instytutu Tyfusowego we Lwowie w latach 1939–1944” [Professor dr Rudolf Weigl and the activity of his Typhus Institute in Lvov in 1939–1944], Wrocław, October 1994, Muzeum Arsenalu wrocławiu, Cieszyńskiego 9.

¹⁰ The Institute employees involved in resistance movement included, among others, major Karol Borkowiec, the chief of Staff of the Lvov Home Army; docent of the Jan Kazimierz University Stefania Skwarczyńska, holding managers positions in underground publishing offices; Tadeusz Garliński associated with the underground Government Representation; Aleksander Szczęścikiewicz, till the war commandant of Lvov Scouts Troop.

¹¹ In 2003 he was posthumously awarded the medal Just among the World's Nations by the Israel institute Yad Vashem.

¹² Szybalski [12] cited also cases of release and return to Lvov of many Poles deported into Siberia; these were due to prof. Weigl's intervention.

work of numerous scientific societies. In 1952, after Hirszfild's many painstaking efforts, the Institute of Immunology and Experimental Therapy of the Polish Academy of Sciences came into being on the strength of the resolution of the Presidium of the Polish Academy of Sciences. In his post-war period of work in Wrocław, Hirszfild published more than 130 out of as many as 394 scientific papers, monographs and textbooks concerning different fields such as Immunology, Serology, Seroantropology, Bacteriology and Epidemiology, Parasitology, Pathology of pregnancy, establishing paternity and maternity, Forensic Medicine and Criminology); he is also author of „History of one life” [18].

In the light of the post-war literature information, prior to the re-entry of Lvov by the Soviet army in 1944, **Prof. R. Weigl** left the city with which he had been associated during all his adult life, and deposited his private and professional belongings in Krakow, Częstochowa and Krościenko on the Dunajec. It follows from Henryk Gaertner's memoirs [5] that there he was arrested by the Soviet army and „transported along with the constantly westward moving front”. Later it was discovered that this relocation coincided with a wait for the telephone proposal of Nikita Chruszczow himself, the then first secretary of the Ukrainian Communist Party, to create a network of typhus institutes in his name in Poland and Ukraine, with the administration in Kiev. Weigl rejected the proposal, along with the proposed title of „academic” [11].

The professor spent the last months of war in Krościenko on Dunajec, in a small laboratory, but in the summer of 1945, he went to Cracow. The Polish authorities offered him a job at Jagiellonian University. On the 1st of July 1945, Weigl was nominated Professor Ordinarius of Jagiellonian University as Head of the II Chair of Microbiology, named the Department of General Bacteriology, and the Ministry letter of July 23rd 1945 specified the number of his teaching hours – at least five hours of lectures and two hours of laboratory courses during the academic year [27]. In the third trimester of the academic year 1945/46, the professor was granted paid leave to go to Stockholm for medical reasons, which was associated with his candidacy for the Nobel prize, which was later withdrawn by the Polish authorities at the last moment. Also, he had been accused by two of his co-workers of collaboration during the German occupation and

though he was exonerated during the trial and though many people knew the truth of his courageous activities during World War II, „the bad opinion of two people prevailed” [28]. In March 1948, on the decision of the President of Poland and the Prime Minister, Prof. Weigl was transferred to the Chair of General Biology at the Medical Faculty of Poznań University as Professor Ordinarius. However even there, as remarked by Bilek [27] „the Cracow situation got repeated. Weigl was only rarely in Poznań and at lectures he was most often replaced by his assistants”. The author explains these failures with the Professor's involvement „in an array of conflicts with the Cracow scientific circles... so different from the Lvov academic circles”. The particulars of these relations was described by Kryński [10] in the context of the public discussion on his doctoral dissertation in 1946 at Jagiellonian University, where the supervisor was Rudolf Weigl, whose conflict with the then Dean of the Medical Faculty was almost ridiculous. A serious reason for the fact that the professor later distanced himself from social and scientific life and for his remaining outside the structure of academic life could be the critical reception Prof. R. Weigl's lecture „Rodents as carriers of the rash typhus germ in its endemic centres” at the XI Congress of Polish Microbiologists in Cracow in May 1951. In the Cracow house where the Professor lived, at ul. Św. Sebastiana 6, he organised a modest Institute of Typhus Studies, where much of the equipment came from the UNRA. However, like all such institutions, the Institute was subordinate to the State Department of Hygiene in Warsaw, and then to its branch in Cracow, whose Head and then Director of the Voivodeship Sanitary-Epidemiological Station formally supervised the personnel and finances of the Institute, on the order of the Sanitary-Epidemiology Department of the Ministry of Health.

Conclusions

From the perspective of the almost half century that has passed since the death of the two professors, the question faced by Scientific Anthropologists is why the post-war fates of the Polish scientists, including the two outstanding microbiologists, Weigl and Hirszfild, were so different. The opinions of some of the professor's co-workers cited below provide a partial answer. Jadwiga Złotorzycka [13]

writes that after World War II Prof. Weigl's merits were not appreciated and his creative potential was not used, while according to Danuta Nespiak [1], the professor „remained persona non grata to the PRL authorities till his death in 1957”. In a similar vein, in his autobiography, Prof. A. Jahn [24] maintains that „*Professor Weigl was an unusual man. The scientist, with his short-trimmed beard, has stuck in my memory as an example of human goodness and culture. To us he was a hero, he spoke excellent German and defended us against the secret police who knew that many active underground members were hiding in the institute. They had their spies there, and Weigl intervened repeatedly, very nearly snatching people back from prison. After the war he found himself in Cracow, and the communist authorities treated him badly or even in a hostile way. Some thought of him as collaborator. He was not admitted into the Polish Academy of Sciences although he was a scientist, an inventor deserving of the Nobel prize*”.

In the 1950s, Professor Weigl withdrew from social and academic life and continued his pre-war typhus research; he started studying the problem of carrying typhus germs by rodents and perfecting his vaccine which was produced on commission of the Health Ministry, mainly for the army. It follows from Bilek's account [27] that „each autumn the Institute's staff and Weigl himself were anxious that the ministry might not extend the contract for the next year”. Also, the vaccine was checked and labelled as product of firstly the State Department of Hygiene (PZH), and then the Management of Sra and Vaccines; it did not follow from the labels that they had been produced in the Weigl institute. After the Professor's sudden death (blood-stroke) at the age of 74 during his holiday in Zakopane in August 1957, the laboratories were supervised for a short time by his second wife, Dr Anna Herzig. They were closed down two years later, after her death in 1959. The laboratories' premises were taken over by the Department of Labour Hygiene of Voivodeship Sanitary-Epidemiological Station (WSSE) in Cracow. The cited „weiglians” write with great bitterness about those who had invested much effort into slandering Weigl, and obscuring his achievements. It follows from Gaertner's account [5] that the professor nevertheless experienced many signs of friendliness, but „regretfully, closer contacts with Weigl were sometimes rendered difficult by the dominant role of Anna Herzig”. The only post-war distinction for the Professor was the

First Grade State Award in 1953 and posthumous Commandery with Star of Polonia Restituta.

Considering the scientific circumstances, it could be concluded that Weigl, as the last of the „microbe hunters”, „science's fanatic and artist”, was predestined, according to Kryński [9], to research work beginning in the 1930s in Virology: a new discipline which he helped to create, as the pioneer of the culture of microorganisms on a live, aseptic substratum. Certainly, after the war, the need to deal with organisation and teaching at the university, which the professor disliked, and the public presentation and publication of the research results, constituted a serious burden. He communicated his results to his Institute co-workers during scientific discussions [4,11,15,25]. However, he was true to the 19th c. tradition according to which a scientist could only write up his scientific discoveries at the end of his life. At the same time, already in the first post-war years, new antibiotics discovered during the 1940s and 1950s, as well the use of DDT to control lice and other arthropods, for which Dr Paul Müller (1899–1965) was awarded the Nobel prize for Medicine and Physiology in 1948 [19], were making a considerable contribution towards controlling typhus and minimizing the problem. The decreasing epidemiological threats in Europe and Poland prevented the typhus institute, which was planned for Weigl, from being established in Poznań or Cracow.

Ludwik Hirszfeld is a timeless character in Science. He had two co-ordinated passions – research work and teaching, and he himself wrote: „*in my opinion a student during the lectures should not only learn the facts that are necessary to pursue the profession, but also the philosophy and charm of the pertinent field of science, and gain an insight into the smithy of thought and scientific technique; the professor's task is to gain a pupil and create a school...*” [18]. The professor's lectures on infectious diseases and Serology in Zurich, at Warsaw University and at the Medical Faculty of Wrocław University and then Medical University attracted crowds of not only medical students but also students in other fields and people from outside academia. They were lectures in many disciplines of Microbiology in its broad sense. When asked about the secret of a good lecture, the professor said: „I know only one rule: he who wants to set the others on fire, must burn himself” [18]. Paweł Jasiénica, who in 1954 published a journalist's book on the Institute of Immunology „*Tales of living matter*”,

says that „Ludwik Hirszfeld was one of those people nobody could remain indifferent to. He had that exceptional gift of awaking extreme feelings in people” [23]. During his life he gained many friends and achieved a much more difficult feat: he found people who were forever faithful to him, no matter the changes of fate. After World War II in the Microbiology Department of the Medical University in Wrocław, a wide circle of pupils gathered around Hirszfeld; with zeal and enthusiasm they undertook research on his problems and ideas. Paweł Jasienica [23], collecting materials for his story of the work of the Institute of Immunology, distinguished three categories of the Professor’s students: „son generation” (department heads – docents, doctors), „grandchild generation” (twenty odd years, academic title and own scientific production) and „great grandchild generation” (the youngest, newly graduated or students, gaining their first experience). Outstanding scientific personalities, the students continuing their master’s traditions, originate from all these groups.

One of the most important persons in Professor Hirszfeld’s life was his wife, Prof. Hanna Hirszfeld, née Kasman, also a physician, a pediatrician; they married during a break between lectures, on September 18th 1919 in St. Alexander’s church in Warsaw. It was the wife who, by giving lessons in Berlin, made it possible for Hirszfeld to cover the expenses for purchasing the first experimental animals. When the professor was to deliver his habilitation lecture in Zurich, for a long time he could not decide whether to read it, as was the custom, or just speak. As he admitted after years: „my wife forbade me to read. Only once in my life she threatened: - If you read from the script, I will divorce you. What could I do?” [18]. The lecture was a great success, and it was always the case. It was the wife who accompanied and helped the professor incessantly during the Balkan adventures and sufferings. Prof. Kozuschek [29], in his book about the life and research of the professor, wrote „Hanna and Ludwik Hirszfeld were a very loving couple, excellently complementing each other, mutually friendly and also friendly to other people till the end of their life”. Co-workers and students could often be found in the Hirszfelds’ flat in Wrocław. In the „History of one life” [18] the professor wrote „I had a beautiful family life. My wife was able to create a hearth of modest refinement and partnership. Whoever came into our home, soon experienced the feeling of conscious

happiness of people who, while being mature, never stopped dreaming”.

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