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Ansbert BAUMANN
Ph. D., Institute of Contemporary European History,
Saarland University (Saarbrücken, Germany)
ansbert.baumann@uni-saarland.de
https://orcid.org/0009-0005-8203-5649

SCIENTISTS AS FORCED LABOURERS: THE CASE OF RESEARCHERS FROM KHARKIV IN THE SOUTH GERMAN PROVINCE DURING WORLD WAR II

This article **aims** to cover a little-known chapter in the history of World War II. In the course of the brutal German occupation rule, not only forced labourers but also scientists were deported from Ukraine to Germany as war booty and forced to work for the Nazi regime. One example of this is mathematicians who arrived in the village of Ummendorf in the Upper Swabia region of southern Germany in the summer of 1943. They were specialists in aerodynamic calculations who had originally come from the Ukrainian Physical-Technical Institute (UPTI) in Kharkiv. In Ummendorf, they came across German colleagues who had been brought there from the city of Aachen, which had been hit by air raids and were deployed there by the Ministry of Aviation for research relevant to the war effort. The researchers from occupied Ukraine also subsequently worked for the Reichsluftwaffe and co-operated with the Göttingen Aerodynamic Research Institute. **The research methodology** is based on the principle of critical historicisation, which is committed to the principle of the greatest possible objectivity and is based on the analysis of a wide range of sources from German archives and the evaluation of relevant, predominantly Western, research literature. In summary, various **conclusions** can be drawn from the events described about both the scientific policy of the Nazi state and the social and socio-cultural dynamics of the time. It shows not only the interest of the Nazi regime in the expertise of

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specialists from occupied Ukraine and the reputation that research work at Ukrainian scientific institutes enjoyed in the racist Nazi state but also the consequences of the everyday coexistence of the scientists with the village population and the difficult situation for the former employees of the Kharkiv's UPTI after the end of the World War II.

***Keywords**: World War II, scientists from occupied Ukraine, applied mathematics, evacuation, Ukrainian Physics and Technology Institute (UPTI), Michael Strscheletzky, Oleksiy Stolyarov, Eugen Litkewitsch, Tatjana Kowrayskaja.*

During World War II, from the summer of 1941, Ukraine suffered more than almost any other country under German occupation, which was associated with brutal human rights violations, including genocide, starvation, destruction, and violence [2—3, 6—7, 22, 24, 27]. The terrible German occupation policy was primarily aimed at the economic exploitation of Ukraine, which was intended to play the role of a colony for the future Germanic empire: this included the complete seizure of economic goods important to the war effort, above all agricultural products and mineral oil, the supply of the Wehrmacht from the country and the re-establishment of businesses to cover the immediate needs of the Wehrmacht and the German armaments industry [12, P. 751—752]. Although the Army High Command had assumed at the end of July 1941 that the Red Army had essentially been destroyed, the first doubts as to whether the Blitzkrieg strategy would actually be successful arose as early as August 1941 [11, P. 283]. For this reason, the original doctrine of not using Soviet civilian workers and prisoners of war for labour service in Germany for racial and ideological reasons was already abandoned at this time — after the Reich Minister for the Occupied Eastern Territories had introduced a general obligation to work for all inhabitants between the ages of 18 and 45 in August 1941, as well as compulsory labour for Jews between the ages of 14 and 60 [21, P. 234], Hitler personally ordered on 31 October 1941 that the Soviet prisoners of war be put to work and adequately fed [30, P. 145]. However, this order came too late for many of the starving and exhausted prisoners, with the result that over half of the 3.5 million Soviet prisoners of war did not survive the winter of 1941/42 [13, P. 379—393]. For this reason, the new "General Plenipotentiary for Labour Deployment" ensured that masses of civilian labourers were also brought to Germany from the occupied Soviet territories from March 1942 [17, P. 234—250]. Ukraine was thus seen by the German occupiers as a reservoir of labour slaves and raw materials — and the traumatic experience of forced labour became a formative experience in Ukrainian history and in the memory of many Ukrainian families — of the approximately 7.9 million men, women and children who were forced to work for the Nazi regime at the end of September 1944 as part of the *Ausländereinsatz*, almost 2.8 million came from the former Soviet Union and over 1.4 million from present-day Ukraine [20].

In contrast to other foreign workers, who were in principle entitled to the same pay as their German colleagues for the same work, special regulations applied to the so-called *Ostarbeiter*. They were paid far less and had almost no social security. The reason for this special treatment was purely racially motivated. The *Ostarbeiter*, most of whom had been deported to Germany because of cruelly carried out forced recru-

itment measures, thus ultimately remained an element of the National Socialist extermination strategy — in this case in the form of "extermination through labour" [8, P. 606—632]. The Soviet population, including the people in Ukraine, was therefore initially judged solely in terms of their physical labour.

It was only when the scientific institutions in the occupied territories in Ukraine were examined more closely by the *Wirtschaftsstab Ost*, which had been created for economic administration in November 1941, that the value that the specialists working there could have for the development of German science and thus possibly also for war research was recognized; on 13 February 1942, a Science Department was therefore created, which was to organize the evaluation and safeguarding of the institutes' stocks and the potential deployment of the researchers [16, P. 361—362]. Although Bernhard Rust, *Reichsminister* of Science, Education, and National Culture, argued on 25 February 1942 that the employment of Soviet scientists in German research institutions should only be permitted in exceptional cases, the Nazi leadership had to recognize, despite all ideological barriers, that the outstanding research work carried out at the universities in Kharkiv and Kyiv, for example, and the highly qualified specialists working at the relevant institutes represented such an enrichment of scientific potential for the entire war economy that they could not be dispensed with under any circumstances. For this reason, a total of 156 scientists and engineers and their families were transferred to Leuna as early as April 1942 to work in mineral oil extraction and the chemical industry [16, P. 333].

The systematic booty and robbery of scientific resources from Ukraine, in which other competing departments and military divisions were involved in addition to the *Wirtschaftsstab Ost*, for example, from the *Einsatzstab Reichsleiter Rosenberg*, the War Economics Office of the Reich Research Council, the Ministry of Aviation and the *Ahnenerbe*, continued to gather pace in the following months. Therefore, a special reception camp was even set up for the researchers at the *IG Farben* camp in Bierau near Kędzierzyn (1934—1945 Heydebreck) in Upper Silesia, where the skilled workers were registered, reported to the police, and sent to their intended place of work, with Himmler personally authorising the transfer of those affected with their families to the Reich territory and the *Wirtschaftsstab Ost* applying for each individual to be released from their Eastern employment, which was then granted by the Reich Security Main Office [18, P. 101]. By March 1944, over 1100 scientists and engineers had been sent to Reich territory via the Bierau camp [16, P. 332—333].

Numerous scientists at various German research centres were also involved in securing and utilizing this "scientific booty": The director of the Kaiser Wilhelm Institute for Silicate Research, Wilhelm Eitel, for example, declared his willingness to provide support in a letter to the Reich Minister for Armaments and Munitions on November 27, 1942 and then described in detail the conditions at the Silicate Institute in Kharkiv, which he was already largely aware of due to the descriptions of employees of the *Wirtschaftsstab Ost*[1]. Eitel reported that he was in the process of analysing the

[1] Archives of the Max Planck Society Berlin (henceforth — ARMPG). Abt. I. Rep. 42. Nr. 41. P. 6. Eitel to Speer, 27.11.42.

scientific papers written there and preparing the future deployment of the institute in the service of German Science. As he saw no possibility of deploying the staff from the Institute in Kharkiv to his institute in Dahlem, he emphasised that the highly qualified researchers should remain in Ukraine and could work there for German research. Since, as far as he knew, "almost nothing" of the facilities in Kharkiv, which were "unique in the world", had been destroyed, he suggested to Speer that he could travel to Kharkiv together with a Russian-speaking employee and then report on the impressions he gained there. However, the inspection of the institute, which Eitel actually carried out on July 14, 1943, was obviously sobering since, as he reported at the end of July 1943, leading executives of the institutes had been abducted and important employees had died in 1941—42 due to exhaustion; in addition, many specialists had accepted jobs in the Ukrainian administration in order to at least be able to support themselves, where they were not even remotely employed according to their outstanding abilities [2]. Shortly afterward, the *Wirtschaftsstab Ost* issued instructions to relocate the research institutes from Kharkiv to Kyiv in view of the approaching Red Army, with Eitel taking over the scientific management and selection of the scientific personnel to be relocated [29, P. 65]. On August 16, 1943, he informed the President of the Kaiser Wilhelm Society, Albert Vögler, that he had indeed succeeded in "securing the Kharkiv Institute's most valuable local scientific workers" [3]. According to the original plan, the scientists were to be relocated to Kyiv together with the institute to work for the German war economy — but the relocation was delayed, and Kharkiv was liberated by the Red Army on August 23, 1943. This left four researchers, whom Eitel had already brought to his institute in Dahlem in the spring of 1943, and some specialists who had previously been interned in labour camps and could be found there by Eitel, such as the silicate engineer Kordyukov, as the only Ukrainian scientists who ultimately worked for the Kaiser Wilhelm Institute for Silicate Research [28, P. 552].

There were also a number of other research facilities in Kharkiv that were of overriding interest to the German war economy, such as the astronomical institute, the metallurgical library, the chemical and endocrinological institutes, as well as the Ukrainian Physical-Technical Institute, UPTI [4] (Український фізико-технічний інститут, УФТІ) [16, P. 362—363]. These were, therefore, also to be relocated before the Red Army moved in, or at least the specialists working there were to be brought to Germany. From the outset, these highly qualified scientists were also subject to the special regulations laid down by the Eastern Economic Staff, according to which they were not to be treated as *Ostarbeiter* but as foreigners and were to receive a foreign passport accordingly [16, P. 333].

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[2] Ibid. Nr. 42. P. 10—13 'Niederschrift über die Prüfung der Charkower Silikat-Institute im Auftrage des Wirtschaftsstabs Ost, Chefgruppe W GW 8 vom 14.7.43, Charkow, den 29.7.43'. P. 10.

[3] Ibid. Nr. 43. P.22—23. Eitel to Vögler, 16.08.43.

[4] Now, it is called the National Science Center "Kharkiv Institute of Physics and Technology" (NSC KIPT). In 2004, during the creation of the Department of Nuclear Physics and Power Engineering of the National Academy of Sciences of Ukraine, NSC "Kharkiv Institute of Physics and Technology" became part of it.

The Specialists from the Aerodynamic Institute of the UPTI in Kharkiv

The UPTI, founded in 1929, where the first splitting of an atomic nucleus in the Soviet Union was achieved in 1932 and had developed into a world-class physics institute under the leadership of physicist Oleksandr Leypunsky (Олександр Ілліч Лейпунський) [25], was of particular interest to the Germans. Although the leading Soviet physicists working there, including Leypunsky, Lev Landau and Sergey Vavilov, were arrested in connection with the Stalinist purges between 1935 and 1938 and the foreign researchers who had been working at the institute until then, such as the Hungarian László Tisza, the Austrians Alexander Weissberg-Cybulski and Georg Placzek and the Germans Friedrich Houtermans and the couple Martin and Barbara Ruhemann, were expelled [1, P. 37—41], there was still a fully functional institute unit there, which was of great interest to the German occupiers: the aerodynamics department carried out measurements that seemed extremely relevant, not least for German aviation research.

In the following, the focus will be on a development that led to a handful of scientists from the UPTI in Kharkiv coming to Upper Swabia in southern Germany to work for the German army. A corresponding case study leaves many questions unanswered, above all those concerning the inner motives of the people concerned, i. e., to what extent the recruitment was linked to coercion or whether it was more a kind of collaboration. Nevertheless, one should be aware that the transitions between these categories were, in many cases, far less clear than later interpretations would suggest, as the transition from endeavouring to secure a perspective of survival for oneself and one's relatives to collaboration with the criminal Nazi system was often fluid.

In fact, the German Ministry of Aviation had considerable funds at its disposal to promote aviation research since 1933 [26, P. 378—382]. The non-university *Aerodynamische Versuchsanstalt* AVA (Aerodynamic Research Institute) in Göttingen, which was headed by Albert Betz since 1937, was able to benefit from this because the application-oriented research carried out at this institute on the behaviour of bodies in air and gas flows was of great interest to the Research Office of the Ministry [26, P. 333—337]. On 26 October 1942, after the capture of the city of Kharkiv by German troops and Hermann Göring's order to secure the entire local industry for the Luftwaffe, the AVA received a report from the Research Office describing the excellent equipment of the UPTI's Aerodynamic Institute and stating that it should be examined to what extent it could be used for the AVA's own scientific work [26, P. 374].

At the beginning of 1943, under the impression of the defeat at Stalingrad, the representative of the Research Office in Kharkiv, Karl Martin Kühn, organised the relocation of the research facilities located there to Lviv, where the *Institut für Deutsche Ostarbeit* (IDO) maintained a branch office with a chemical institute, where the work begun in Kharkiv was to be continued. This also applied to the remaining members of the UPTI's Aerodynamic Institute, who were certified by the Reich Security Main Office on 19 March 1943 as "highly qualified specialists" who urgently needed

to be deployed to "carry out research tasks important to the war effort unhindered"; for this reason, they were not to be treated as *Ostarbeiter*[5].

One of these highly qualified scientists was Mikhail Streletsky (Михайло Стшелецький, Михаил Стрелецкий), born in Simbirsk on October 12, 1904[6]. His father was the Russian army officer Nikolai Nikolayevich Streletsky (1875—1933), who had been educated in Moscow, while his mother Julia (August 5, 1875) originally came from Ostrogozhsk. He grew up in Sumy, where he first attended the cadet corps, then grammar school, and finally technical college, from which he graduated as an engineer in 1927. From 1925 to 1934, he worked as a design engineer, then as head of the design office for flow machines at the Sumy Machine-Building Plant (Сумський машинобудівний завод ім. М.В. Фрунзе) and held a teaching position at the Sumy Technical University for hydraulics and flow research. In 1934, he went to the turbine factory in Kharkiv as head of the design office and taught courses on fluid mechanics at the technical university there, where he received his doctorate in 1938 and was then appointed professor. During this time, he also carried out calculations on ship propellers on behalf of the Soviet People's Commissariat of the Navy, among others. From November 1941, Streletsky worked for the German Air Force as head of the Aerodynamic Institute of the UPTI. In this context, he emphasised that his father's mother came from East Prussia and that he was, therefore, of German descent on his grandmother's side, and from then on, he called himself "Michael Strscheletzky". He obviously benefited from his almost perfect command of the German language. In March 1943, Strscheletzky and his assistant Oleksiy Stolyarov (Олексій Столяров; November 25, 1905, Dyakonovo) were sent to the Aeronautical Radio Research Institute in Oberpfaffenhofen as part of the transfers mentioned above, which worked in close cooperation with the neighbouring Dornier company on the development of processes and devices in the field of aviation that were important to the war effort. Strscheletzky headed a calculation office there, which was significantly called the "Kharkiv branch", where his wife Tamara Strscheletzky (May 1, 1918, Kharkiv) and Stolyarov's wife Galina Stolyarova (February 17, 1912, Voronezh) were also employed as technical assistants[7]. From there, the former UPTI employees travelled on to a destination in the Upper Swabian province in July 1943: the small community of Ummendorf near Biberach[8]. Why did the scientists from Ukraine move to this village in Upper Swabia? The reason was quite simple and showed how systematically the Research Office of the Reich Air Ministry deployed the experts who specialised in calculations in the field of applied mathematics; at the same time, other mathematicians working for the Ministry of Aviation were also settled there and dealt with very similar scientific issues to the specialists from Kharkiv.

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[5] Biberach District Archives (henceforth — KABC). UVB. Bü. 1455. P. 5. Reich Security Main Office to Research Office of the Reich Air Ministry, 19.03.43.

[6] Central Archive of the German Aerospace Centre Göttingen (henceforth — ADLR). AK-21592 Curriculum vitae, 07. 08. 44; Karlsruhe Institute of Technology Archives (henceforth — KITA). Folder 21013. 1120. Doctoral thesis Strscheletzky, Curriculum vitae, 1948 n. D.

[7] Arolsen Archives — International Center on Nazi Persecution (henceforth — Arolsen). DE ITS 2.1.1.1 BY 101. RUS 7. ZM 03.

[8] KABC. UVB. Bü. 1455. P. 4. District administration Biberach to Research Office.

German colleagues in Ummendorf

The background to this is that the relocation measures affected not only the Eastern European specialists who were deported to Reich territory ahead of the approaching Red Army but also the German armaments industry and, not least, the most important research centres vital to the war effort, which were relocated from the areas threatened by heavy air raids to remote parts of the German Reich from the early summer of 1943. This initially affected the Kaiser Wilhelm Institutes concentrated around Berlin, whose directors were informed on June 10, 1943, that all institutes, especially those involved in research important to the war effort, had to take measures for a possible relocation. As the plans quickly took shape, it was decided to relocate some of the Kaiser Wilhelm Society's research institutes to the Gau Württemberg-Hohenzollern, as this region, which was classified as safe from air raids, was already the target for the relocation of numerous armaments companies — between March and December 1943, a total of 365 companies with 15,604 employees were relocated there. The Kaiser Wilhelm Institutes for Biochemistry and Virus Research were moved to Tübingen, the Institutes for Biology and Physics to Hechingen, the Institute for Chemistry to Tailfingen, and the Stuttgart Institute for Metal Research to Eningen [5, P. 461—462].

In the period that followed, numerous other research institutions at various universities and colleges within and outside the borders of the "Greater German Reich" were affected by the evacuation measures, some of whose relevance for wartime research was not immediately recognisable. In the field of aviation research, for example, mathematical considerations and their connection to applied physics became increasingly important in this context, so such research institutions also had to be increasingly protected from the threat of enemy air attacks. This also concerned the Institute for Practical Mathematics at the Technical University in Aachen, whose director, Robert Sauer, had already been attracting attention for several years with several important papers on fluid mechanics. Together with his colleague Franz Krauß, a professor at the Aachen Institute of Pure Mathematics, he also worked on a theory of the flow of compressible gases at high speeds, particularly in local supersonic speed, known as "gas dynamics". These investigations were of great interest to the Reich Aviation Ministry so Sauer was involved in the development of the A 4 (V 2) rocket in Peenemünde from 1941 onwards[9]; there was also collaboration with the Hermann Göring Aviation Research Institute (LFA) in Braunschweig and with the Army Ordnance Office, for which Sauer carried out projects to calculate air resistance and the trajectory of projectiles [14, P. 314]. The Institute for Practical Mathematics in Aachen, therefore, carried out mathematical research relevant to the war, which had many points of contact with the work at the Aerodynamic Institute in Kharkiv.

The Institute of Physics at Aachen Technical University, which had been under the direction of Wilhelm Fucks since 1941, also produced work of particular interest to armaments research during this period: On January 18, 1943, Fucks justified the

[9] Archive of the RWTH Aachen (henceforth — ATHAC). Ex 2970. Sauer to Ehrenberg, 06.10.41.

necessity of acquiring a cathode ray oscillograph with the war-relevant significance of his investigations, which he carried out on behalf of the High Command of the Navy and the *Deutsche Versuchsanstalt für Luftfahrt* DVL (German Aviation Research Institute), Berlin-Adlershof [14, P. 324]. The main focus was apparently on researching turbulence in air flows, a field of research that the Hungarian aerodynamicist Theodore von Kármán had already worked on as a professor in Aachen before he had to leave the TH in 1934 due to his Jewish origins. The Kármán vortex street discovered by the latter, two parallel rows of vortices with opposite directions of rotation, is of immense importance for the measurement of turbulence, especially on aerofoil profiles and missiles. Fucks therefore carried out concrete measurements on the basis of Kármán's discovery [9, P. 63]. These investigations overlapped with the work of his colleague Robert Sauer, who approached the problem on a mathematical basis. The aerodynamic research at the Institute of Physics and the Institute of Practical Mathematics thus complemented each other.

After Aachen was subjected to a heavy air raid on the night of 13th to 14th July 1943, in which the buildings of the Technical University were also badly hit, the Reich Aviation Ministry reacted immediately and issued a secret telegraphic order on 14th of July that the Institute for Practical Mathematics and the Physics Institute of the Technical University were to be relocated immediately to Ummendorf, near Biberach, in the rectory there [10]. The reasons why the Upper Swabian community of Ummendorf was chosen as the alternative location for the institutes were probably manifold; in any case, the town was strategically located on the Ulm-Friedrichshafen railway line and, with the aforementioned rectory, had a building that, in the eyes of those responsible, was predestined for such a use: it was a former castle building from the 16th century, which, with its numerous rooms and large cellar, seemed well suited to accommodate the two research institutes. There was also another large building in the village, the so-called Bräuhaus, which was also available for potential other use and had, therefore, already been inspected by several war-related research institutes [11].

On July 31, Robert Sauer's mathematical institute moved to Ummendorf, and at the beginning of August Wilhelm Fucks and five of his colleagues also arrived there with the equipment of the Institute of Physics, while the mathematician Franz Krauß settled in Gutenzell, just a few kilometres away [5, P. 467]. Sauer's work continued to focus on the flow of compressible gases, which were important for the development of the V-2 rocket, among other things so that he was able to underpin his reputation as a scientist important to the war effort [12]. At the Institute of Physics, the working group headed by Wilhelm Fucks carried out the research already begun in Aachen on the operating behaviour and application of anemometers based on the principle of gas discharge [13]. The focus

[10] Ibid. Ex 967. Research Office of the Reich Air Ministry Ehrenberg, 14.07.43.
[11] Hauptstaatsarchiv Stuttgart (henceforth — HStAS). E 151/03. Bü. 907/2. P. 1. Area representative for air defence to the Württemberg Minister of the Interior Schmid, 24.08.43.
[12] ATHAC. Ex 2970. Sauer to Ehrenberg, 06.10.41.
[13] Ibid. Ex 315. Schumacher to Deanery, 21.02.46.

was on experiments to develop new anemometric methods for turbulence investigations, particularly on aircraft wings, which were reported in detail to the Aerodynamic Institute of the German Aviation Research Centre (*Deutsche Versuchsanstalt für Luftfahrt*) in Berlin-Adlershof [9, P. 94—102]. In addition, Fucks carried out pressure and temperature measurements with ion probes on behalf of the Navy High Command, which, like the work of his colleague Sauer, met with lively interest from Walther Gerlach [14].

As already indicated, it was no coincidence that the German scientists from Aachen arrived in Ummendorf on exactly the same day as the specialists: Michael Strscheletzky with his wife Tamara and his mother Julia, as well as Oleksiy Stolyarov with his wife Galina and their five-year-old daughter of the same name actually also arrived there on 31 July 1943. The German contact person for the scientists from Kharkiv was aviation staff engineer Walter Weinberger, who, as a scientific employee of the Ministry of Aviation, had completed his doctorate under Robert Sauer with a study on the flow behaviour of propellers immediately before the transfer of the Mathematical Institute from Aachen and had then also been sent to Ummendorf to coordinate the work of the German and Ukrainian scientists on behalf of the Munich Aviation Research Institute. After the arrival of experts, Weinberger contacted Friedrich Wilhelm Riegels from the AVA and reported that he had now provisionally accommodated them in Ummendorf so that they could analyse their previous research results and present them in a report. However, according to Weinberger, it would make sense to transfer the former UPTI employees to Göttingen, where Riegels was currently working on very similar topics [15].

In his reply, Riegels showed great interest in the collaboration of Strscheletzky and Stolyarov but referred to the problem of accommodating the scientists, which would be "very difficult" as there was hardly any space available in Göttingen [16]. However, Weinberger now favoured the remaining of the researchers in Ummendorf anyway and apparently also saw this as an opportunity for his personal career. Accordingly, he suggested that the scientists could travel to Göttingen for the meetings with Riegels and Betz that were necessary for the cooperation [17]. In the meantime, there were now excellent work opportunities in Ummendorf because he had been able to rent a hall in the local brewery [18]. According to Weinberger, the financial support would be provided until 31 October 1943 by Robert Sauer's Institute for Practical Mathematics; from 1 November 1943, orders would then have to be placed by the AVA's research management, which was to set up a new office under his direction for this purpose [19]. In fact, on 1 November 1943, a corresponding Luftwaffe office was set up in the brewery building under Weinberger's management [20].

[14] Bundesarchiv Berlin (henceforth — BA). R 26 III. 510. Gerlach to Fucks, 21.09.44.
[15] ADLR. AK-17680 Weinberger to Riegels, 23.08.43.
[16] Ibid. Riegels to Weinberger, 31.08.43.
[17] Ibid. Weinberger to Riegels, 08.09.43.
[18] HStAS. E 151/03. Bü. 907/2. P. 2. District Administrator to Minister of the Interior, 07. 09. 43.
[19] ADLR. AK-17680 Weinberger to Riegels, 08.09.43.
[20] KABC. UVB. Bü. 1455. P. 3. Air Force Administration Ulm to District Administrator, 26.08.44.

Scientific work in a remote region

The background to the research group's permanent stay in Ummendorf was that Sauer and Weinberger had agreed at a meeting with Chief Engineer Ebert from the Oberpfaffenhofen Research Institute on 1st of September that Strscheletzky could just as well continue his important circulation calculations there and work together with Sauer in an excellent manner. Sauer, therefore, applied for corresponding support from the Research Office of the Reich Air Ministry for the period from July 29 to October 31, 1943. The AVA expressly welcomed the fact that the scientists would remain in Ummendorf and was prepared to take over their scientific supervision "under these circumstances" [21]. It was agreed that the AVA would award a "war-important" external contract [22], initially limited to the period from 1 November 1943 to June 30, 1944, to the *Dienststelle Weinberger* for Strscheletzky's theoretical propeller calculations, the anticipated costs of which would amount to around 1.500 Reichsmark per month [23]. It was also determined that it would be expedient to use two to three additional assistants were employed as calculators [24].

For this reason, the *Dienststelle* endeavoured to find suitably qualified people and quickly found what they were looking for: Two of Strscheletzky's former colleagues from Kharkiv, graduate engineers Yevhen Litkevych (Євген Літкевич, 4 February 1909, Markivka), and Tetyana Kovrayskaya (Тетяна Коврайська, 5 June 1917, Kharkiv), who were listed in the German files as Eugen Litkewitsch and Tatjana Kowrayskaja, seemed ideally suited for the job. The problem was that both were now employed in the chemical laboratory of the *Institut für Deutsche Ostarbeit* in Lviv, which was part of the Research Office of the Reich Air Ministry and whose director, Karl Martin Kühn, had transferred not only specialised personnel but also important experimental equipment from Kharkiv to Lviv in July 1943 [25]. As it was not assumed in Ummendorf that Kühn would be prepared to give up two of his employees without further ado and the efforts made by the department to contact him up to that point had not been successful, the AVA was asked for support [26]. The AVA then actually intervened with the Research Office of the Reich Air Ministry [27], and finally succeeded in obtaining the transfer of the two experts to Ummendorf from the Reich Aviation Ministry: On 23 November 1943, it was reported that the engineer Litkewitsch had arrived in Ummendorf together with his wife Helena (Гелена; 25 April 1908, Kharkiv), a doctor with a doctorate from Kyiv University, their son Jurij (Юрій; 20 December 1933, Kharkiv) and his mother Anna (Анна; 28 December 1876, Markivka),

[21] ADLR. AK-17680 Riegels to Weinberger, 11.09.43.
[22] Ibid. Confirmation letter of the AVA, 11.10.43.
[23] Ibid. Riegels to the AVA, 04.10.43.
[24] Ibid. Schneider to Riegels, 14.10.43.
[25] ARMPG. Abt. I. Rep. 42. Nr. 42. P.11. Report on the audit of the Institute on 14 July 1943, 29.7.43.
[26] ADLR. AK-17680 Weinberger to the AVA, 14.10.43.
[27] Ibid. Riegels to Weinberger, 16.11.43.

and urgently needed the necessary documents to ensure that he too did not fall under the regulations for *Ostarbeiter*[28].

In fact, the arrival of the scientists from Kharkiv (Strscheletzky, Stolyarov, Litkewitsch, Kowrayskaja) and their families further aggravated the already tense housing situation[29] in the community of Ummendorf[30]. The difficulties in obtaining suitable accommodation also had a direct impact on the research activities of those affected, as can be seen from a report by Strscheletzky, which he sent to the AVA in Göttingen at the end of November and in which he reported that he had not yet had the opportunity to complete the theoretical part of his work, as the office room was the only room that could be heated and had to be used as a living room by the researchers at times due to the cold weather [31]. In view of these difficulties, the head of the department, Weinberger, even considered transferring the scientists to Göttingen after all in early January 1944. On the other hand, for Weinberger, who was working on gas dynamics problems on behalf of the Munich Aviation Research Institute and therefore had a personal interest in continuing to work efficiently with Robert Sauer, they were ideally suited to providing a convincing argument to his superiors that his presence in Ummendorf was indispensable for the time being[32].

Although the working conditions of Strscheletzky's team had improved overall by the beginning of 1944[33], conflicts of interest and responsibility with Weinberger also became apparent: in January 1944, for example, Weinberger asked the AVA in connection with his own research project whether he could occasionally employ Mrs. Kowrayskaja with calculations[34]. This request was initially granted[35], but by March the work of the research group and thus also the mission of the AVA was directly hindered by Weinberger's activities, as he was now permanently using a "good calculating machine" that Sauer had lent to Strscheletzky so that the latter had to ask the AVA to provide him with another calculating machine[36].

The self-confidence with which Strscheletzky approached the AVA also manifested itself in a request he made to his contact person there, Riegels, in mid-April 1944, informing him that he wanted to protect the copyright to a ship's propeller he had developed and the special calculation method for it by means of a patent and had therefore already contacted the office in Munich responsible for the former employees of the UPTI and the Patent Office in Munich. He had been told there that he could only obtain the patent with the support of the AVA, which he now wanted to ask for[37]. Riegels reacted rather hesitantly; two weeks later, he told Weinberger that the problem

[28] Ibid. Weinberger to Riegels, 23.09.43.
[29] HStAS. E 151/03. Bü. 904. P. 77. District Administrator to Minister of the Interior, 10.06.41.
[30] KABC. UVB. Bü. 1455. P. 1. Mayor of Ummendorf to District administration, 26.11.43.
[31] ADLR. AK-17680. Strscheletzky to Riegels, 30.11.43.
[32] Ibid. Weinberger to Riegels, 11.01.44.
[33] Ibid. Strscheletzky to Riegels, 18.01.44.
[34] Ibid. Weinberger to Riegels, 11.01.44.
[35] Ibid. Riegels to Weinberger, 02.02.44.
[36] Ibid. Strscheletzky to Riegels, 03.03.44.
[37] Ibid. Strscheletzky to Riegels, 13.04.44.

was that Strscheletzky was not a co-worker of the AVA and therefore the legal regulations regarding the treatment of inventions by employees could not be applied. In his opinion, the latter worked as a freelancer, and therefore, it seemed advisable to him that he should present himself to the Reich Patent Office. However, he was not sure whether Strscheletzky had the necessary financial resources at his disposal that would automatically arise when processing patents [38]. The patent application, therefore, had to be postponed indefinitely for the time being.

Nevertheless, the scientists from Ukraine, who had been declared stateless in the early summer of 1944, were shown great respect; Weinberger, therefore, also recognised that they should be provided with better working materials and informed the AVA that Strscheletzky urgently needed functioning calculating machines [39]. Undoubtedly, the work of the specialist from Ukraine was also highly valued by the AVA, so that the employment relationship between the department and the research institute was extended for the period from 1 July to 31 December 1944 without any problems [40].

Meanwhile, Strscheletzky himself continued to try to acquire a German patent for the ship's propellers he had developed; however, after he had succeeded in being released from his Soviet citizenship, he now combined this with his efforts to obtain German citizenship — at the beginning of September, he once again requested the support of Riegels for his corresponding advances [41] As he was obviously in a hurry, he followed up a short time later and asked the AVA for a letter of recommendation for the acquisition of German citizenship. He also stated that he wanted to become a full AVA employee as soon as possible in order to have more favourable working conditions [42]. Riegels replied two days later in a rather stalling tone and informed him that he had spoken to Betz in the meantime and that the latter would reply to him in writing. The question of whether Strscheletzky could become a member of the AVA had not yet been decided due to the urgency of the current research work [43].

Despite this rather disappointing development, Strscheletzky was obviously well aware of his growing reputation at the AVA and, therefore, now also addressed the sensitive issue of his pay, pointing out that according to the old regulations of the UPTI, all employees received almost the same salary, which was 1.12 Reichsmark per hour for professors, lecturers, assistants and scientists, while an unqualified draughtswoman or laboratory assistant received 1 Reichsmark and the cleaning lady 0.90 Reichsmark. This pay scale had also been applied by the *Dienststelle Weinberger* so far so that he only received a monthly salary of 230 Reichsmark, which would hardly be enough for him to survive and certainly not enough to finance a patent application. He therefore asked that he be paid a salary commensurate with his work [44]. Riegels replied that he had already

[38] Ibid. Riegels to Weinberger, 27.04.44.
[39] Ibid. Weinberger to Riegels, 05.06.44.
[40] Ibid. Confirmation letter of the AVA, 27.07.44.
[41] Ibid. Strscheletzky to Riegels, 07.09.44.
[42] Ibid. Strscheletzky to Riegels, 13.09.44.
[43] Ibid. Riegels to Strscheletzky, 15.09.44.
[44] Ibid. Strscheletzky to Riegels, 06.10.44.

thought about a change in salary, but that such a change could not be implemented at present [45]. Shortly afterward, he informed Weinberger that there had been a 25 percent salary increase at the AVA in the meantime, which could certainly also be granted to the scientists, thus accommodating Strscheletzky's request for a revision of the salaries. The salary for the latter would have to be discussed in detail again anyway [46]. These lines show once again the appreciation for Strscheletzky, who was undoubtedly the central scientist of the department and irreplaceable for the progress of the work — for example, when he fell ill with pneumonia in mid-October 1944, this alone slowed down the work, as he was unable to supervise and check the progress of the work himself [47]. As Weinberger noted at the end of November, an improvement was then achieved in the salary issue in that salaries were recalculated from the 1st of September, which was already equivalent to a 25 % pay raise for female employees; he wanted to introduce a corresponding regulation for male employees with retroactive effect from 1 November [48].

In this context, Riegels emphasised that it was up to Weinberger to find an appropriate salary arrangement in accordance with the statutory provisions; the AVA was only interested in the salaries and other costs to the extent that it must be ensured that the work is in the right proportion to its price [49]. However, there was no doubt within the AVA about the outstanding quality of Strscheletzky's propeller calculations; in the meantime, these had also aroused the interest of Riegel's colleagues, with Irmgard Flügge-Lotz in particular enquiring in detail about Strscheletzky's work during a meeting in November 1944 and requesting detailed information from Riegels in this regard [50].

A further indication of the AVA's recognition is that Strscheletzky and his employees were apparently deliberately protected from official bodies: In connection with the salary issue, Riegels remarked to Weinberger that it was not necessarily advisable to discuss this in too much detail at the moment because the urgency of the research assignment was currently being questioned [51]. A letter from Strscheletzky to Riegels dated November 1, 1944, in which he reported that the engineer Litkewitsch currently had no work and had to be given "some kind of work" within the next week, also documents a trusting relationship in this respect; he even requested that the AVA send a corresponding dispatch to Major Schumacher (Olmütz, Hama-Werke protectorate), who was responsible for Litkewitsch's employment [52]. Litkewitsch was indeed kept on; and on January 3, 1945, the AVA confirmed that Strscheletzky would continue to work with his office in Ummendorf near Biberach (Württ.) on an important wartime assignment for the Aerodynamic Research Institute "for the period from January 1, 1945 to June 31, 1945 [sic!]" [53].

[45] Ibid. Riegels to Strscheletzky, 11.10.44.
[46] Ibid. Riegels to Weinberger, 28.10.44.
[47] Ibid. Schneider to Riegels, 23.10.44.
[48] Ibid. Weinberger to Riegels, 25.11.44.
[49] Ibid. Riegels to Weinberger, 15.12.44.
[50] Ibid. Weinberger to Riegels, 25.11.44.
[51] Ibid. Riegels to Weinberger, 28.10.44.
[52] Ibid. Strscheletzky to Riegels, 01.11.44.
[53] Ibid. Confirmation letter of the AVA, 03.01.45.

However, the department was faced with increasingly difficult conditions, with the lack of calculating machines continuing to be an obstacle to the smooth running of the group [54]. To make matters worse, Robert Sauer also had to supply other scientists with calculating machines at the end of 1944 [55]: after the devastating air raid on Darmstadt city centre on September 11, 1944, in which the Technical University there was also badly hit, the Geometric Institute, headed by Heinrich Graf, had been relocated to the immediate vicinity of Ummendorf, to Rißegg [56]. Graf thus also came to the Upper Swabian province and continued his research activities there, which were also classified as "important for the war effort" [57], whereby the proximity to Sauer was certainly a not insignificant reason for the choice of alternative accommodation, as the intensive scientific cooperation between Sauer and Graf could now be continued without major difficulties [58]. As Sauer still needed ever greater capacity for his own aerodynamic calculations, from the beginning of 1945 not only Weinberger but also a mathematician originally assigned to Strscheletzky had to support Sauer's calculations [59]. At the same time, the AVA also needed more and more calculating capacity and therefore urgently asked Strscheletzky to return a calculating machine from Göttingen [60]. Despite the tense situation, Weinberger stated to the AVA on March 10, 1945 that the office was working excellently and that the calculations were making good progress [61].

The end of the research group

Overall, the research assignments carried out by the department for the AVA between November 1943 and April 1945 were primarily aimed at improving armaments technology developments and were, therefore, directly related to the ballistic measurements and gas dynamics experiments that the Kaiser Wilhelm Institute for Fluid Dynamics Research carried out on behalf of the AVA during these years. This meant that the calculations of Strscheletzky's group were, in turn, closely related to Sauer's work, so that points of contact must have arisen again and again in the everyday calculations. The connection of the scientists from Kharkiv to the AVA is nevertheless remarkable, as it was subject to extremely restrictive secrecy regulations and usually did not allow foreigners any insight into its research activities.

The work of the scientists evacuated or deported to Upper Swabia aroused the interest of the occupying power after the invasion of the French troops in April 1945.

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[54] Ibid. Weinberger to Riegels, 25.11.44.
[55] Ibid.
[56] Historical Archive of TU Darmstadt. TH 25/01. Nr. 223/1. Bd. 1. P. 144 Confirmation letter of the Rector of the Technical University of Darmstadt, 21.09.44.
[57] Ibid. P. 146 Confirmation letter of the Rector of the Technical University of Darmstadt, 27.01.45.
[58] KITA. Folder 2202. 32a. Scholder to Rust, 27.01.44.
[59] ADLR. AK-17680 Weinberger to Riegels, 29.01.45.
[60] Ibid. Riegels to Weinberger, 09.01.45.
[61] Ibid. Weinberger to Riegels, 10.03.45.

This was particularly true for Hubert Schardin, whose Ballistic Institute had been relocated from Berlin-Gatow to Biberach, just a few kilometres away [4, P. 241—244]. As early as the summer of 1945, Schardin and many of his employees joined the French Army Ordnance Office. He was followed by numerous employees from the institutes of Robert Sauer and Wilhelm Fucks, who worked in Ummendorf[62].

However, the situation was particularly difficult for the employees of the *Dienststelle Weinberger*: according to German law, they were "stateless", but in the eyes of the French military administration, they were still considered Soviet citizens. But there was one exception: As the French were very interested in Michael Strscheletzky's expertise and his propeller calculations, he was still treated as a German scientist, as he had already declared himself a "*Volksdeutscher*" in 1944 with reference to his grandmother[63], and, like Schardin's research group, was officially conscripted by the French state, which meant that he was in the service of the French Navy from October 1, 1945[64]. Strscheletzky's former employees, on the other hand, were not granted any special rights by the French occupying power. They were, therefore, treated as Soviet civilians to whom the inter-allied regulations on repatriation agreed at the Yalta Conference were to apply [15, P. 277—278]. In accordance with these agreements, France signed an agreement with the Soviet Union on June 29, 1945 in which both sides undertook to hand over citizens of the other country to the state authorities of the home country [23, P. 169—170]. According to this agreement, the persons concerned were to be transferred to the Soviet administration via the military liaison centres, which could have devastating consequences, especially in the case of persons who had previously worked "voluntarily" for the Nazi state [19, P. 33—34].

For this reason, the researchers from Kharkiv who had been in Ummendorf had good reason to evade capture by the Red Army. Eugen Litkewitsch managed to do this in a particularly spectacular way: He was apprehended several times, but always able to escape and finally found a safe hiding place to escape Soviet capture for good: On July 12, 1945, he had himself and his family admitted to the Schussenried Psychiatric Sanatorium, which had been designated a collection point for mentally ill Eastern workers on September 6, 1944[65], with the unspecific diagnosis of "contact psychosis"[66]. Tatjana Kowrayskaja was also admitted to the sanatorium on the same day with the same diagnosis[67], where she died on April 12, 1946 under unexplained circumstances[68]. The Litkewitsch family, on the other hand, was released from the

[62] ATHAC. Ex 91. Geller to Seewald, 11.09.45; KITA. Folder 21001. 121. Pösch to Reutter, 20.01.46.
[63] ADLR. AK-21592 Curriculum vitae, 07.08.44.
[64] KITA. Folder 21013. 1120. Doctoral thesis Strscheletzky, Curriculum vitae, 1948 n. D.
[65] BA. R 1501. 3763. Runderlass des Reichsministers des Innern, betr. Geisteskranke Ostarbeiter und Polen, 06.09.44.
[66] Archive of the Zentrum für Psychiatrie Südwürttemberg, Weissenau. Heilanstalt Schussenried. Frauen-Hauptbuch. Nr. 4815—4816, 12.07.45.
[67] Ibid. Nr. 4817, 12.07.45.
[68] Arolsen. 02020202. 0334. Death certificate from the Schussenried registry office, 23.05.50.

Schussenried sanatorium on September 11, 1946 and initially lived in Biberach, where Helena had already worked as a doctor in the district hospital during her time in Ummendorf, before emigrating to the USA in the summer of 1950 and settling in St. Paul, Minnesota, where Anna died in 1959, Helene in 1973 and Eugene in 1997[69].

Michael Strscheletzky worked in the French Navy until March 1947 and then became a consultant for *Voith-Turbinenwerke* in Heidenheim from 1947 and was also a lecturer at the Technical Universities of Karlsruhe, Stuttgart and Munich. Although he had already worked as a professor in Ukraine, he submitted another dissertation on the hydrodynamic principles for calculating ship propulsion systems to the Technical University of Karlsruhe in 1948 and was officially awarded his doctorate in Germany[70]. At this time, he was already running a calculation office in Kressbronn on Lake Constance, became a member of the German Aerospace Society and moved to Friedrichshafen in 1950, where he lived with his wife as a highly respected scientist until he died in 1991 [10, P. 1205]; his wife Tamara passed away in 2012[71].

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The work of the scientists from the research institute in Kharkiv in the Upper Swabian province opens interesting perspectives on the Nazi state in several respects.

From a socio-historical perspective, the arbitrary nature of Nazi racial ideology becomes clear once again — if people were of interest to those in power, they could quickly be declared "*Volksdeutsche*" or stateless. On the other hand, this legal status was in many cases only temporary for the people concerned, as their further fate depended on the interests of the Allied occupying power on the ground and thus again on a certain arbitrariness: Michael Strscheletzky was declared a German, while Eugen Litkewitsch was considered a Soviet citizen in the eyes of the French occupying authorities and had to fear for his life due to the threat of extradition to the Soviet Union as a result of the inter-Allied agreements.

From the perspective of the history of science, the episode shows how strategically the research management of the Reich Aviation Ministry proceeded by locating not only the research facilities of the most diverse provenance relevant to the air war but also the associated armaments industry in the Biberach-Ummendorf area between 1943 and 1945. However, it is ultimately not entirely clear to what extent this concept was successful and whether, despite the spatial concentration, many institutions may have conducted research side by side without taking any notice of each other. Moreover, from today's perspective, it is also difficult to judge how important the work of the researchers involved, both from Aachen and from Kharkiv, actually was for the German Wehrmacht or whether it did not offer the scientists the opportunity to conduct de facto basic research under the guise of wartime importance. In terms of scientific history, the work is significant simply because the aerodynamic and

[69] Ibid. DP 2425. 03010101. 14 321. Documents of the Litkewitsch family.
[70] KITA. Folder 21013. 1120. Doctoral thesis Strscheletzky, 1948.
[71] Fridrichshafen City Archives. Population Register.

ballistic measurements were so computationally intensive that more and more electronic calculating machines had to be used, which were then continuously developed over time. Applied mathematics thus became a kind of catalyst for the emergence of computer science and for the digitalisation of science.

Finally, from a micro-historical perspective, it becomes clear how, in the face of the war situation, modernity burst upon the small, agricultural village of Ummendorf and confronted the village community with fundamental changes. This initially involved the accommodation of the scientists, for whom more and more flats in the village had to be requisitioned, but also other issues of village life, such as the conversion of the brewery with the neighbouring inn into a research institute, which meant that the village population lost a communal space. However, the long-established population in Ummendorf seems to have come to terms with many of these measures quite quickly, and the scientists, including the people from Kharkiv, seem to have been integrated into everyday village life relatively easily: for example, the son of the Litkewitsch family quickly made a large circle of friends among the village children, if the eyewitness accounts are to be believed, and his mother, as the only local doctor, was regularly visited by the villagers. Nevertheless, it was precisely at this personal level that striking differences between the German scientists and their colleagues originally from Ukraine became apparent after the war: while the German researchers were able to continue their work and careers without any problems after a relatively short time, the former employees of the UPTI in Kharkiv, who had been expelled from their old homeland had no such opportunities. Michael Strscheletzky was at least able to continue his profession. Eugen Litkewitsch and Tatjana Kowrayskaja had to fear for their lives and fled to a psychiatric sanatorium, where Kowrayskaja died, while the Litkewitsch family was later able to emigrate to the USA. The further fate of their former colleague Stolyarov and his family is completely unknown. All in all, the events of 1945 did not represent a real liberation for the scientists from Kharkiv.

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Ансберт БАУМАНН
доктор філософії, Інститут новітньої європейської історії,
Саарландський університет (Саарбрюкен, Німеччина)
ansbert.baumann@uni-saarland.de
https://orcid.org/0009-0005-8203-5649

НАУКОВЦІ ЯК ПРИМУСОВІ ПРАЦІВНИКИ: ВЧЕНІ З ХАРКОВА В ПІВДЕННОНІМЕЦЬКІЙ ПРОВІНЦІЇ ПІД ЧАС ДРУГОЇ СВІТОВОЇ ВІЙНИ

Мета полягає у висвітленні маловідомої сторінки в історії Другої світової війни, коли під час жорстокої німецької окупації з України до Райху як військову здобич серед решти примусових працівників депортували також науковців, змушених працювати на нацистський режим. Ідеться про математиків, співробітників Українського фізико-технічного інституту (УФТІ), розташованого у Харкові, котрі були фахівцями з аеродинамічних розрахунків. Влітку 1943 р. їх привезли у с. Уммендорф у регіоні Верхня Швабія на півдні Німеччини. Тут вони зустрілися з німецькими колегами з м. Аахен, що зазнавало авіанальотів, евакуйованими Міністерством авіації в порівняно безпечний регіон для проведення досліджень, пов'язаних із військовою промисловістю. Згодом вчені з окупованої України також співпрацювали з Ґеттінґенським аеродинамічним науково-дослідним інститутом. **Методологія** ґрунтується на принципі критичної історизації, що полягає в дотриманні засад максимальної неупередженості та базується на аналізі широкого кола джерел із німецьких архівів й оцінці відповідної, переважно західної, спеціальної літератури. **Висновки.** На основі представленого матеріалу можна скласти враження як про політику нацистської держави в науковій сфері, так і про соціальну, соціокультурну динаміку того часу. Йдеться не лише про зацікавленість гітлерівського режиму в досвідчених фахівцях з окупованих територій, про їх високу репутацію, але й про наслідки повсякденного співіснування вчених із сільським населенням та складне становище колишніх співробітників харківського НДІ по закінченні війни.

***Ключові слова**: Друга світова війна, вчені з окупованої України, прикладна математика, евакуація, Український фізико-технічний інститут (УФТІ), Михайло Стрелецький, Олексій Столяров, Євген Літкевич, Тетяна Коврайська.*