Forschungsprogramm „Geschichte der Kaiser-Wilhelm-Gesellschaft im Nationalsozialismus“
Research Program “History of the Kaiser Wilhelm Society in the National Socialist Era”

RESEARCH FOR AUTARKY

THE CONTRIBUTION OF SCIENTISTS TO NAZI RULE IN GERMANY

Susanne Heim

Ergebnisse 4

IMPRESSUM

Ergebnisse. Vorabdrucke aus dem Forschungsprogramm
„Geschichte der Kaiser-Wilhelm-Gesellschaft im Nationalsozialismus“

Herausgegeben von Carola Sachse im Auftrag der Präsidentenkommission
der Max-Planck-Gesellschaft zur Förderung der Wissenschaften e. V.

Redaktion: Christine Rüter

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CONTENT

ABSTRACT/KURZFASSUNG

The paper deals with the development of ideologically “innocuous” scientific disciplines like plant and animal breeding during the Nazi era, the shift in scientific objects, methods and questions, and the contribution of scientists to the Nazi rule. The German Ministry for Food and Agriculture generously sponsored the research of several Kaiser Wilhelm Institutes in order to reduce the import of food or raw material – and on the other hand developed a strategy of hunger as a German weapon against the Soviet Union.

War created the material possibilities which allowed German scientists to secure an advantage in important fields. This included the preferential treatment of research which was considered relevant for warfare, as well as the control of strategically important scientific resources (genetic resources, wild plants) which became available only because of the German occupation of large parts of Eastern Europe. War further played an important role in the coalition of interests between the political leadership and the scientific community: Political control of research was unnecessary – indeed counterproductive – as long as scientists were offered good research and career opportunities: confiscated buildings, money, professional advancement through new positions in the occupied areas, and the opportunity to exploit the scientific results of their colleagues in the occupied countries.

In dem Beitrag wird die Entwicklung von ideologisch „unverdächtigen“ Wissenschaftsdisziplinen wie Pflanzen- und Tierzucht während des Nationalsozialismus untersucht, der Wandel der wissenschaftlichen Objekte, Methoden und Fragestellungen sowie der Beitrag der Wissenschaftler zur nationalsozialistischen Herrschaft. Das Reichsministerium für Ernährung und Landwirtschaft finanzierte in großem Umfang Forschungen in verschiedenen Instituten der Kaiser-Wilhelm-Gesellschaft, um Nahrungsmittel und Rohstoffe aus dem Ausland durch heimische Produkte zu ersetzen – und es entwickelte gleichzeitig eine Hungerstrategie als deutsche Waffe im Krieg gegen die Zivilbevölkerung in der Sowjetunion.

Der Krieg bot deutschen Wissenschaftlern die materiellen Voraussetzungen, um sich Vorteile auf wichtigen Forschungsfeldern zu sichern. Dazu gehörten sowohl die Förderung der als kriegswichtig anerkannten Forschung als auch die Kontrolle über strategisch wichtige Forschungsressourcen (genetische Ressourcen, Wildpflanzen), die nur aufgrund der Okkupation weiter Teile Osteuropas zugänglich geworden waren. Darüber hinaus war der Krieg eine wichtige Voraussetzung für die Interessenskoalition zwischen politischer Führung und wissenschaftlicher Intelligenz. Politische Vorgaben für die Forschung waren nicht nötig – und nicht funktional –, so lange den Wissenschaftlern gute Forschungs- und Karrieremöglichkeiten geboten wurden, wie z. B. konfiszierte Gebäude, Geld, beruflicher Aufstieg in neue Positionen in den besetzten Gebieten sowie die Möglichkeit, die Forschungsergebnisse ihrer Kollegen in den besetzten Ländern zu nutzen.

Research for Autarky
The Contribution of Scientists to Nazi Rule in Germany*

Susanne Heim

INTRODUCTION

The Nazis are usually presumed to have hindered the development of science by limiting its freedom:[1] by throwing Jewish and leftist scholars out of their jobs, by imposing ideological dogmas (like the "*Arische Physik*" or the "*Deutsche Mathematik*"), and indirectly by causing isolation of German scholars from the international scientific community. The Minister of Education was considered incompetent and science policy seemed to have failed because of polycratic chaos.[2] The Nazi regime in general was seen as hostile towards science and its politicians as anti-intellectual. From this perspective the majority of German scientists suffered from the Nazi policy without playing any active role, so they survived the Swastika without being compromised. According to a wide-spread (self-) image, they retreated into an ivory tower or into non-politicized marginal spheres of science, doing their serious research while only a very few who mostly did bad or pseudo-science were involved in Nazi policy. The participation of scientists in crimes such as "euthanasia" and medical experiments on prisoners in concentration camps is considered a brutal or even perverse exception. What is considered to be problematic is science being involved with politics and being utilized or "abused" by the Nazi politicians. Science in general, however, remained comparatively intact: The major part of science seems to have been apolitical, far away from practice, politics and crimes and therefore easily transferable into another political system.

Only during the last few years has this view shifted so that instead of seeing the Nazis as enemies of science they are regarded as a kind of supporter of science. Recent publications have stressed that Nazi rule was buttressed by the work of many scholars who did research in various branches in order to prepare German territorial expansion and strengthen Nazi rule in the occupied territories as well as in the Reich. From the 1980s on, first the large-scale involvement of medical science in sterilization politics and "euthanasia" was investigated, and then the role of social scientists who worked as planners and consultants of the German resettlement and anti-Jewish policy in the occupied territories in Eastern

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* Paper for the International Scholars' Conference "Remembering for the Future 2000. The Holocaust in an Age of Genocides", Oxford and London, 16–23 July 2000.

1 Helmuth Albrecht/Armin Hermann, Die Kaiser-Wilhelm-Gesellschaft im Dritten Reich (1933–1945), in: Rudolf Vierhaus/Bernhard vom Brocke (eds.), Forschung im Spannungsfeld von Politik und Gesellschaft. Geschichte und Struktur der Kaiser-Wilhelm-/Max-Planck-Gesellschaft aus Anlaß ihres 75jährigen Bestehens, Stuttgart 1990, pp. 356-406.

2 Michael Grüttner, Wissenschaft, in: Wolfgang Benz/Hermann Graml/Hermann Weiß (eds.), Enzyklopädie des Nationalsozialismus, Stuttgart 1997, pp. 135-153.

Europe. The participation of these scholars in crimes and occupation rule is quite obvious.[3]

The focus of this paper, however, is another group of scientists who worked in disciplines superficially regarded as "innocuous" like plant or animal breeding or who did ecological research. Most of them seem to have continued the work they did before 1933 and went on with the same research after 1945: looking for the "improvement" of plants by making them tolerant to certain diseases or unfavorable climate conditions (frost, aridity, etc.) in order to raise the agricultural output. Is this impression of continuity right? How did this research develop during the Nazi era? Was there any major change in the scientific objects, questions and methods? Was science influenced by political prescriptions or events? What about the personal engagement of scientists? Did they take advantage of the Nazi policy? Did they ignore the political circumstances of their work or try to influence them? In what direction?

I am dealing with certain institutes of the Kaiser Wilhelm Society (KWS). Founded in 1911, the Kaiser Wilhelm Society for the Advancement of Science was the most prestigious scientific research organization in Germany. Under the roof of the society about thirty research institutes were maintained in the 1930s, most of them doing research in natural science. Most famous German scientists and Nobel prizewinners were members of the elite KWS.

The function of the Kaiser Wilhelm Society was less the financing than the organization and coordination of research. The funds mainly came from the Emergency Association for German Science which later changed its name to German Research Association (*Deutsche Forschungsgemeinschaft*, *DFG*),[4] from other sponsors like the Rockefeller Foundation, and from industry as well as government ministries.

I focus on those institutes which were mainly financed by the German Ministry of Food and Agriculture (*Reichsministerium für Ernährung und Landwirtschaft*, *RMEL*): the Kaiser Wilhelm Institute (KWI) for Breeding Research in Müncheberg (east of Berlin); the KWI for Research on Bast Fiber; and the KWI for Cul-

3 To mention a few of the large number of studies I may refer to: Gisela Bock, Zwangssterilisation im Nationalsozialismus. Studien zur Rassenpolitik und Frauenpolitik, Opladen 1986; Götz Aly/Susanne Heim, Vordenker der Vernichtung. Auschwitz und die deutschen Pläne für eine neue europäische Ordnung, Hamburg 1991; Mechthild Rössler/Sabine Schleiermacher (eds.), Der "Generalplan Ost". Hauptlinien der nationalsozialistischen Planungs- und Vernichtungspolitik, Berlin 1993; Jörg Gutberger, Volk, Raum und Sozialstruktur. Sozialstruktur- und Sozialraumforschung im "Dritten Reich", Münster 1996; Frank-Rutger Hausmann, "Deutsche Geisteswissenschaft" im Zweiten Weltkrieg. Die "Aktion Ritterbusch" (1940–1945), Dresden 1998; Michael Fahlbusch, Wissenschaft im Dienst der nationalsozialistischen Politik? Die "Volksdeutschen Forschungsgemeinschaften" von 1931–1945, Baden-Baden 1999.

4 Ute Deichmann mentions that 40 % of the money the *Deutsche Forschungsgemeinschaft* spent on botanical research (the best funded branch of biological science) went to the KWI for Breeding Research, Ute Deichmann, Biologen unter Hitler. Porträt einer Wissenschaft im NS-Staat, 2nd edition, Frankfurt/Main 1995, p. 73.

tivated Plants in Tuttenhof near Vienna. The Kaiser Wilhelm Society maintained several other institutes which belong in this context but are only touched on here marginally: the KWI for Research on Animal Breeding near Rostock, which was also financed by the *RMEL* and promoted very much by the State Secretary Herbert Backe (mentioned later); the German Bulgarian Institute for Agrarian Research in Sofia, founded in 1942; the German Bulgarian Research Unit for Microbiology at Thassos;[5] the German-Greek Institute for Biology; the bird protection station Rositten; and several institutes engaged in maritime and lake research: the Hydrobiological Institute Plön, the Institute for Freshwater Research and Freshwater Economy (*Seenforschung und Seenbewirtschaftung*) at the Lake Constance, the Biological Station Lunz in Lower Austria, and the Institute for Marine Biology in Rovigno (near Trieste). In some of these institutes (namely in the KWI for Research on Cultivated Plants)[6] research on biological weapons was done; but this is beyond the scope of this paper.

The Nazi assumption of power in January 1933 is usually seen as a turning point in history. In the institutes investigated here, however, major political changes did not occur in 1933[7] but instead in 1936/37 when the Office of the Four Year Plan (*Vierjahresplanbehörde*) and the German Research Council (*Reichsforschungsrat*) were founded. The preparation of the German economy for war entailed a first attempt to restructure research projects and financial policy in the institutes (in order to adjust scientific work to the aim of making Germany independent from foreign imports of food and raw material). Nevertheless, most scientists seem to have perceived this as natural rather than restrictive and some of them voluntarily changed their research schedule or endeavored to contribute to the national effort that the Four Year Plan was seen to be.[8] Ernst Telschow, the Secretary General of the KWS, became responsible for all

5 This research unit was a disguised military institute under the umbrella of the Kaiser Wilhelm Society. According to Telschow, the Secretary General of the KWS, the research unit should "just fulfill certain tasks for the army. Since the army may not be mentioned the KWS has taken its place", see *Aktenvermerk* of 1 February 1944, Archive on the History of the Max Planck Society (henceforth: MPS Archive), I, 1A, 2960/6. It was up to the army to finance and plan the research, see letter of Telschow to Schumann (research department of the Army Ordnance/Military High Command, *Heereswaffenamt*/*Oberkommando der Wehrmacht*), 5 May 1942, MPS Archive, I, 1A, 2960/1. The prospective director was Professor Kurt Poppe of the Institute for the Research on Animal Epidemics in Rostock, who prepared the establishment of laboratories from 1942 to 1944 but never started work on the chosen island. According to the Ministry of Education, the research unit was to work on "questions of the fight against animal epidemics especially in the east", see letter to the KWS, 12 October 1942, MPS Archive, I, 1A, 2960/5; see Deichmann, Biologen, p. 243.

6 Letter of Stubbe to the KWS, 4 October 1944, MPS Archive, I, 1A, 2964/3.

7 As far as I could ascertain, there were no Jewish or left-winged scientists and only one Jewish gardener in the KWI for Breeding Research, so the Law for the Restoration of the Professional Civil Service had little effect there.

8 The director of the Institute for Freshwater Research worked out very detailed plans on how to reorganize not only his institute but also the whole sector of freshwater fishing according to the aims of the Four Year Plan. He discussed his paper with Herbert Backe in the Ministry for Food and Agriculture. He proposed the breeding of efficient races as well as raising the productivity of lakes and the prescription of obligatory fish days in public canteens, see H. J. Elster, Vorschläge für Maßnahmen zur Förderung und Intensivierung der Deutschen Binnenfischerei im Rahmen des Vierjahresplanes, 3 July 1937, MPS Archive, I, 1A, 2832/1, 2832/2.

research questions in the Staff of Raw Material and Currency (*Rohstoff- und Devisenstab*), a predecessor organization of the Office of the Four Year Plan. In his new position Telschow tried to direct research in order to find substitutes for imports of expensive raw materials.

The two most important individuals who linked research at the institutes investigated here to political practice were Konrad Meyer and Herbert Backe. The latter was Vice President of the Kaiser Wilhelm Society from 1941 to 1945. Backe grew up in the Soviet Union and later studied agriculture in Göttingen. As a secretary of state in the *RMEL* he soon became more influential than his minister Walther Darré, especially after he was nominated head of the Directorial Committee for Nutrition in the General Council of the Four Year Plan (*Chefgruppe Ernährung im Generalrat des Vierjahresplans)*. In 1942 he succeeded Darré as minister. Backe was one of the representatives of the Nazi state who emphatically promoted practice-oriented science and its use in Nazi policy. According to Telschow, Backe always defended the independence of the KWS against political influence.[9] He often visited the KWI for Breeding Research; he was chair of the board of trustees, and he regarded the animal breeding institute as his very own foundation. Furthermore, he received some of the KWI directors as well as Telschow in order to discuss specific problems concerning the adjustment of research to the aims of the Four Year Plan. Backe was a personal friend of Reinhard Heydrich and often met with Heinrich Himmler and Hitler to speak about politically precarious questions like "*Ernährungssicherheit*" (security of food supply). He was one of the inventors of the German starvation strategy against the Soviet Union and in this context planned the death of millions of civilians by seizing the food grain in order to bring it to Germany.[10]

More than 80 per cent of the funds of the Institute for Breeding Research came from Backe's ministry. The *RMEL* financed the research on plant and animal breeding in the context of Germany's deficit in the production of food and raw material. Germany mainly produced carbohydrates and had to import proteins and fat, and this in a situation of permanent and increasingly severe lack of foreign currency. The deficit in national food production was also seen as critical because the lack of food supply had been regarded as decisive for the defeat in World War I. Research on food plants was in a certain aspect the contribution of science to the policy of self-sufficiency.

Konrad Meyer was a professor of agriculture and a high-ranking SS official. Like Backe, Meyer studied agrarian science in Göttingen, where one of his professors was Fritz von Wettstein.[11] As an agrarian scientist Meyer focused his research on two subjects: plant breeding and the social structure of rural re-

9 Deichmann, Biologen, p. 182.

10 Aly/Heim, Vordenker, pp. 365 ff.; Christian Gerlach, Die Bedeutung der deutschen Ernährungspolitik für die Beschleunigung des Mordes an den Juden 1942, in: idem, Krieg, Ernährung, Völkermord. Forschungen zur deutschen Vernichtungspolitik im Zweiten Weltkrieg, Hamburg 1998, pp. 167-257.

11 See Meyer's unpublished memoirs "Über Höhen und Tiefen. Ein Lebensbericht", p. 47. I am grateful to Matthias Burchardt for access to this report.

gions. Meyer's main function during the Nazi era, however, was not as a scholar, but rather as a coordinator of agricultural research, Vice President of the *DFG*, and a Nazi policy maker. As head of Himmler's Planning Office he became one of the authors of the *Generalplan Ost*. This plan involved the "evacuation" of tens of millions of Russian civilians as well as the Germanization of large parts of the occupied territories.[12] Working in the Ministry for Education, he reorganized agrarian research and education at the universities. The alleged incompetence of the Minister of Education Bernhard Rust did not as is often assumed lead to chaos, inefficiency, and the failure of any science policy, but on the contrary to more power for an energetic and ambitious young man such as Meyer.[13] Further, Meyer initiated the unification of all agrarian research and education institutes in the *Forschungsdienst*. The journal review of this institution, edited by Meyer, appears to be a compendium of agricultural research as a common effort of all scientific institutions concerned to overcome Germany's food crisis.[14] The *Forschungsdienst* formed part of the German Research Council, which was responsible for decisions regarding public research funds. In this institution Meyer was also the decisive man for agricultural science (*Fachspartenleiter*). He received all reports about the research activities in Müncheberg.[15] As Wilhelm Rudorf, the director of the KWI for Breeding Research, emphasized, Meyer was "very often in touch with the institute".[16]

THE PARADIGM OF BREEDING

Plant breeding as an academic discipline was established only at the end of the 19th century. One of its pioneers was Erwin Baur, who in 1927 became director of the newly founded Kaiser Wilhelm Institute for Breeding Research. Baur was co-author of the famous book "Grundriß der menschlichen Erblichkeitslehre und Rassenhygiene", first published in 1921 and better known as "Baur/Fischer/Lenz". The book became a standard work during the interwar period and influenced Hitler's position on the subject.[17] Baur was convinced of the racial inferiority of the Slavs compared to the average German and strongly believed in the necessity of preventing racial "decay" and of "bettering" the nation's genetic

12 See Aly/Heim, Vordenker, pp. 156-157, 394 ff.; Mechthild Rössler, Konrad Meyer und der "Generalplan Ost" in der Beurteilung der Nürnberger Prozesse, in: Rössler/Schleiermacher (eds.), Generalplan, pp. 356-367.

13 In his memoirs p. 72 Meyer mentions that Rust let him "völlig freie Hand" and that he also had the confidence of the leading men in the *RMEL*, namely of Darré and Backe.

14 The review was named *Forschungsdienst*, like the institution itself, see: Forschung für Volk und Nahrungsfreiheit. Arbeitsbericht 1938 bis 1941 des Forschungsdienstes und Überblick über die im Reichsforschungsrat auf dem Gebiet der Landwirtschaft geleistete Arbeit, Berlin 1942.

15 MPS Archive, I, 51, 10/1.

16 Rudorf's letter to the KWS, 4 April 1941, MPS Archive, I, 1A, 2613/5.

17 Reimar Gilsenbach, Erwin Baur. Eine deutsche Chronik, in: Götz Aly et al. (eds.), Arbeitsmarkt und Sondererlaß. Menschenverwertung, Rassenpolitik und Arbeitsamt, Berlin 1990, pp. 184-197, here: p. 188.

inheritance by breeding and selection as well as through the racial hygienic laws.[18]

Baur had serious conflicts with the *RMEL*[19] but he nevertheless completely agreed with the policy of autarky. He had always stressed the necessity of making Germany independent from foreign food and raw material and saw the task of plant breeding science in contributing to this goal.[20] Baur considered autarky in fat and protein to be feasible within a few years[21] and stressed the necessity of mobilizing agriculture with the prospect of war.[22]

Baur's optimism concerning autarky was based among other things on a recent research success in his institute. His assistant Reinhold von Sengbusch had developed a new method to determine the percentage of fat in lupines. They planned to patent machines for quick and large-scale application of the new technique at the beginning of 1933.[23]

In 1927 the same von Sengbusch had already found a method to single out in a large amount of lupine seeds those mutations which were free of alkaloid. The sweet lupines bred from these seeds could be used as animal fodder and thus replace fodder imports from overseas countries. The research on lupines was of particular relevance for the policy of autarky. The high percentage of fat and protein and the fact that this plant grows even on light sandy ground caused scientists as well as agrarian politicians to hope that lupines could help fill up Germany's "fat and protein gap". Until von Sengbusch's research success most lupines were too bitter to be used as fodder. According to Baur, von Sengbusch's sweet lupine had brought German researchers a head start of about two years compared to their Russian colleagues.[24] The research on lupines, which was financed continuously during wartime,[25] was just one of various projects to find fodder plants which could be cultivated in Germany or continental Europe.

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18 Ibid.

19 Baur's trouble concerned the financial problems of his institute and must be seen in the context of his competition with the minister Walther Darré, whose agrarian concepts Baur disliked.

20 Jonathan Harwood, Styles of Scientific Thought. The German Genetics Community 1900–1933, Chicago 1993, p. 229, characterizes Baur as a representative of the pragmatic style of thought, a very successful institution-builder and science policy maker with good connections to the agricultural industry.

21 See Baur's lecture "Nationalwirtschaftliche Aufgaben und Möglichkeiten der Pflanzenzüchtung", in: Archiv des Deutschen Landwirtschaftsrats 51, 1933, pp. 1-14.

22 Concerning Baur's ideas about the role of plant breeding in the preparation for war see Michael Flitner, Sammler, Räuber und Gelehrte. Die politischen Interessen an pflanzengenetischen Ressourcen 1895–1995, Frankfurt/Main 1995, pp. 68 ff.

23 Protocol of the meeting of the administrative committee (*Verwaltungsausschuß*) of the KWI for Breeding Research, 2 February 1933, MPS Archive, I, 1A, 2603/3.

24 Confidential remark of Baur from 1932, MPS Archive, I, 1A, 2718/3. Baur was anxious to maintain the head start against foreign (Russian) advances.

25 Money came from the *RMEL* as well as from Konrad Meyer's *Forschungsdienst*, see MPS Archive, I, 1A, 2668, 2669. Report of Dr. Paul Schwarze to the Reichsforschungsrat, 5 April 1944, MPS Archive, I, 51, 10/1. Schwarze was responsible for the biochemical research on fodder plants, a work which was classified in the highest category while plant breeding research ranked in the second category, see ibid. 10/2.

Researchers in the Kaiser Wilhelm Institute were also engaged in breeding experiments with soyabeans, rape, turnips, alfalfa, clover, vetch, millet, and sunflowers. Basic research on the rules of inheritance was mostly done on snapdragons. Other research objects in the KWI were potatoes, topinambur, tomatoes, various kinds of fruits, and wine. The aim was to make plants important for feeding human beings or animals as tolerant as possible to vermin, disease, aridity and frost.

The normal way of breeding was to select the best plants out of a large population and facilitate their reproduction. But from the 1920s on, professionals agreed upon the fact that breeding results could no longer be optimized by selection alone.[26] The rediscovery of the Mendelian laws accelerated the change to the new method of breeding by combination, that is, the crossbreeding of two plants of the same family but with different qualities. But this also made selection necessary in order to find the right plants for combination out of a huge mass of seeds. Thus von Sengbusch's discovery was recognized by the scientific community as a very important step.

This scientific change in plant breeding had two parallels in the discourse on racial hygiene concerning human beings. The idea of breeding the best individuals in order to better the race played, as is well known, an important role in scientific debate of the time. "Baur/Fischer/Lenz" is one of the most famous but by no way the only book to draw a direct parallel from optimizing plants and animals to what was called the "higher breeding of human beings". And Baur, apart from being the founder of the KWI for Breeding Research, contributed decisively to the establishment of the Kaiser Wilhelm Institute for Anthropology, Eugenics and Human Genetics in the same year.[27] Hermann Kuckuck, assistant at the KWI for Breeding Research, started his book about plant breeding with the following words to emphasize the parallels:

> "All racial hygienic measures which are taken today against the threatening decay and decline of the most valuable racial components of our nation are based on the knowledge that throughout the centuries selection takes place in the body of every nation and is decisive for the nation's fate. The decline of old civilized nations can be attributed to the fact that the culture-bearing strata procreated less in comparison to the inferior ones. […] Selection takes place all over the organic world and leads to fundamental changes in structure. Human beings, animals and plants are subject to the same biological laws."[28]

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26 Flitner, Sammler, p. 66.

27 Elisabeth Schiemann, Erwin Baur. Nachruf, in: Berichte der Deutschen Botanischen Gesellschaft 52, 1934, pp. 51-114, here: p. 106.

28 Hermann Kuckuck, Von der Wildpflanze zur Kulturpflanze. Die Bedeutung der natürlichen und künstlichen Zuchtwahl für die Entstehung neuer Pflanzenrassen, Berlin 1934, p. 7. According to the author's own affirmation, the book was temporarily banned but republished in a large number of copies on behalf of the Heeresfeldbücherei (army's library) in 1943, Hermann Kuckuck, Wandel und Beständigkeit im Leben eines Pflanzenzüchters, Berlin 1988, p. 30. In 1936 Kuckuck had been discharged from the institute together with the below-mentioned Stubbe as one of the "marxist group".

According to Kuckuck, plant breeding had brought the insight that human races also had to be protected by efficient means like sterilization laws.[29] Usually in the 1930s the idea of human betterment was mostly connected to the eradication of negative genetic qualities (by excluding the alleged bearers of these qualities from procreation), while plant breeding worked the other way round by selecting the best of each generation for further breeding. But there were also concepts of breeding the best human beings which were not limited to pronatalist policy toward educated people and the middle classes. So in the Kaiser Wilhelm Institute for Brain Research scientists worked on the brains of elite people, and the director Oscar Vogt favored the idea that men and women with similar talents should marry each other in order to breed their qualities.[30]

Another correspondence between breeding plants and breeding human beings, however, exists in the development of new techniques of selection or, rather: in the mechanization of mass selection in both sectors. Among physicians in the 1920s and 1930s the demand to register the genetic equipment of extended families of individuals with certain diseases or conspicuous behavior was quite popular. There were various projects to collect medical data from the entire population of a particular region[31] or an ethnic group,[32] or to map a person's ancestors in a genealogical tree and use this for medical diagnosis.[33] Standardized forms were introduced to record the differences between twins concerning their behavior, intelligence, social, intellectual and practical capacities.[34] Institutions were built to collect health as well as social data. The employment of Hollerith machines helped to cope with the flood of information.[35] From all these enterprises scientists not only hoped to gain insights into the secrets of inheritance but also to predict the future development of an individual, to forecast whether a couple's children were likely to become desirable offspring or not. In the next step this knowledge could be – and finally was – also used for selection. The distinction between "worthy" and "unworthy" individuals or groups, which soon became of practical relevance for German social and racial policy in the 1930s, would not have been possible without the collection of data that pro-

29 Kuckuck, Wildpflanze, p. 68.

30 Michael Hagner, Gehirnführung. Zur Anatomie der geistigen Funktionen, 1870–1930, in: idem, Ecce cortex. Beiträge zur Geschichte des modernen Gehirns, Göttingen 1999, pp. 177-205, here: p. 200. Indeed, several married couples worked as scientists in the Brain Research Institute.

31 See Horst Rechenbach's attempt to register the (mostly communist) population of Moordorf, Ulrich Kimpel, Moordorf. Ausschußerbmasse und züchterische Auslese, in: Götz Aly et al. (eds.), Modelle für ein deutsches Europa. Ökonomie und Herrschaft im Großwirtschaftsraum, Berlin 1992, pp. 199-206.

32 For example Robert Ritter's research on gypsies.

33 Bernd Gausemeier, Walter Scheidt und die "Bevölkerungsbiologie". Ein Beitrag zur Geschichte der "Rassenbiologie" in der Weimarer Republik und im "Dritten Reich", M.A. Thesis, Dept. of History, Free University Berlin 1998.

34 Mitchell Ash, Psychologische Zwillingsforschung am Kaiser-Wilhelm-Institut für Anthropologie, in: Doris Kaufmann/Hans-Walter Schmuhl (eds.), Rassenforschung im Nationalsozialismus. Konzepte und wissenschaftliche Praxis unter dem Dach der Kaiser-Wilhelm-Gesellschaft, Göttingen, forthcoming, 2002.

35 Götz Aly/Karl Heinz Roth, Die restlose Erfassung. Volkszählen, Identifizieren, Aussondern im Nationalsozialismus, Berlin 1984; Edwin Black, IBM und der Holocaust, Berlin 2001.

vided a scientific basis for discrimination policies and the idea of breeding the best.[36] This kind of science helped to shape and standardize the criteria of selection, thereby making mass screening possible.

Similar techniques and projects were planned in botanical research as well. In addition to von Sengbusch's invention there was another project connected with the history of the Kaiser Wilhelm Society and its Institute for Breeding Research. Like physicians and demographers trying to register entire populations, the botanists did the same with plants. In 1927 the Russian geneticist Nikolai Ivanovič Vavilov had published his theory of "centers of origin" which is still regarded as very important for plant breeding today. According to Vavilov, there are certain geographical regions where one species of cultivated plants exists in an enormous range of varieties. In these centers the botanist can find a lot of various genetic material of the same plant for breeding. Wild relatives of plants which had certain desirable qualities (tolerance to a specific disease, etc.) could be found in these pools and used for combination with their cultivated relatives. The method of plant breeding by backcross (*Rückkreuzung*) of cultivated plants with their wild or "primitive" relatives was favored by Erwin Baur.[37] As a consequence of Vavilov's theory, access to centers of origin (or more generally into regions where wild forms of a certain cultivated plant existed in great variety) was a strategic key for plant breeders. Excursions were made to collect wild forms of grain in order to breed domestic economic plants and thereby optimize agricultural production.

In 1926 Baur had traveled to Turkey, in 1928 to Spain, in 1929 to Russia, in 1931 to South America, where he collected about 1,000 potatoes for further breeding experiments.[38] When he died in December 1933, the Senate of the Kaiser Wilhelm Society regarded this as a "national disaster" and an "irreplaceable loss for the German nation and German science".[39]

During National Socialism plant-collecting expeditions were not only supported but also regarded as a matter of national identity and proof of the pioneer spirit in German science. They took more and more the character of military enterprises and were accompanied by the army.[40] In 1935 a German expedition fi-

36 The registration of the population according to racial categories was the precondition for a differentiated racial policy: privileges for the "worthy" Germans and a broad spectrum of discriminating laws for Jews, Gypsies and other "unworthy" people, see Aly/Roth, Erfassung. A considerable amount of medical and family data had to be presented in order to gain permission for marriage not only in the SS with its special breeding concepts, but also among ordinary "Aryans".

37 Tornow even states that Baur invented the method of breeding by backcross which formed the basis of his fame, see Werner Tornow, Die Entwicklungslinien der landwirtschaftlichen Forschung in Deutschland unter besonderer Berücksichtigung ihrer institutionellen Formen, Münster 1955, p. 107.

38 Ibid., p. 106. The trip to Russia is mentioned in: Otto Keune, Männer, die Nahrung schufen, Hannover 1952, p. 519.

39 Protokoll der Senatssitzung vom 2.6.1934, MPS Archive.

40 Flitner, Sammler, p. 113; on p. 278 Flitner reports some more expeditions apart from those mentioned here.

nanced mainly by Konrad Meyer's *Forschungsdienst* started for the Hindukusch region. Usually, scientists of various faculties took part in such journeys: botanists as well as anthropologists, physicians and language researchers. The results from the trip were important not only for the institute in Müncheberg but also for the bast fiber institute[41] and later on for the KWI for the Research on Cultivated Plants. The Hindukusch researchers brought home a great deal of data, not only on plants, but also on the population of the region, and impressions about their cultural standards, psychological makeup and racial composition.[42] The KWI for Breeding Research had sent Klaus von Rosenstiel, an SS-man, who, notwithstanding his original profession, did not only collect plants during the trip but also measured skulls and bodies of the indigenous population.[43] Arnold Scheibe, the leader of the Hindukusch expedition and later head of the German Bulgarian Institute for Agricultural Research in Sofia, a Kaiser Wilhelm Institute as well, had spent more than two years in Turkey collecting plants. In 1935, when the expedition started, he worked in the Registry Office of Plant Varieties (*Sortenregisterstelle*) of the Nazi agricultural organization *Reichsnährstand*.[44] The very existence of such an office shows that not only researchers but also political institutions took part in the project of registering plants.[45] Another biologist, Friedrich Boas from Munich, requested money for taking inventory of the nation's biological wealth. In his application for the project he stressed the economic meaning of that research and put it in a military context, speaking about "highest biological defence readiness".[46] Further expeditions were made in 1934 and 1937 to the Himalayan region and to Tibet in 1938/39.[47] In 1941 and 1942 two expeditions went to the Balkan states (these will be addressed later). The Tibet expedition was arranged by the SS-foundation *Ahnenerbe* and led by Ernst Schäfer with the personal support of Himmler, who was particularly interested in that research. In Tibet Schäfer's team measured the bodies of more than 300 persons of the local population and collected 5,000 samples of different grains.[48] Later on Schäfer, on behalf of Himmler, prepared a special expedition to the Caucasus. The purpose of this mission was

41 According to the Institute's report from 1937/38, about 100 samples of linen, collected in Asia's high mountains during the Hindukusch expedition, were cultivated at the institute, Tätigkeitsbericht über das 18. Geschäftsjahr vom 1. April 1937 bis 31. März 1938, MPS Archive, I, 1A, 2204/3.

42 Flitner, Sammler, pp. 60-65 documented Baur's remarks about the "Rassenmischmasch" (mixture of races) among the Anatolian population and about the superiority of German cultural standards compared to Turkish or French. For the expedition to the Hindukusch region see Flitner, Sammler, pp. 74 ff.; Mechthild Rössler/Sabine Schleiermacher, Himmlers Imperium auf dem "Dach der Erde". Asien-Expeditionen im Nationalsozialismus, in: Michael Hubenstorf et al. (eds.), Medizingeschichte und Gesellschaftskritik. Festschrift für Gerhard Baader, Husum 1997, pp. 436-453.

43 Flitner, Sammler, pp. 75-78.

44 Ibid., p. 74.

45 The registration of seed was combined with detailed orders to the farmers to use only specified, efficient sorts which entailed a drastic reduction of the number of sorts; ibid., pp. 81-85.

46 Deichmann, Biologen, p. 105.

47 Rössler/Schleiermacher, Imperium, pp. 440-446; about the expedition to Tibet see: Michael Kater, Das "Ahnenerbe" der SS 1935–1945. Ein Beitrag zur Kulturpolitik des Dritten Reiches, Munich 1997.

48 Rössler/Schleiermacher, Imperium, p. 443.

primarily military and has to be seen in the context of Himmler's plans to destabilize British influence by initiating a coup d'etat in Afghanistan and instigating riots in the Far East. These plans had to be changed several times because, from the German perspective, Russia turned from an ally into an enemy. But after the German army had occupied the Caucasian oil fields in August 1942, Schäfer received Himmler's order of a "complete investigation" of the Caucasus.[49] Himmler himself, who was a student of Gustav Frölich, the future director of the Kaiser Wilhelm Institue for Research on Animal Breeding, was an enthusiastic adept of the idea of breeding. Not only did he establish animal and plant breeding projects in many concentration camps and saw breeding as an instrument for autarky,[50] but he also intended to breed a German elite in the SS.[51] Because of the German defeat in Stalingrad the Caucasus enterprise had to be given up. From today's perspective, the ambitious plans to conquer the Far East (India and China) sound absurd and seem to be proof of German presumptuousness and megalomania. But at the beginning of the 1940s it might not have seemed unrealistic that in the long run (that is, at the end of the war) five out of seven centers of origin (according to Vavilov) known at that time would be within German range.[52] This was the horizon German plant breeders had for their work. As a comparatively young discipline, breeding research provided many opportunities for scientists – in terms of possible discoveries as well as in terms of career.

WAR AS AN OPPORTUNITY

In the 1930s biologists hoped to receive important insights into the rules of inheritance and to create or find material for breeding by gaining knowledge from other branches of biological research like radiation and chemical experiments that were being employed to cause mutations. Through experiments with flies as well as – in botany – with snapdragons, scientists hoped to learn how to induce valuable mutations as a starting point for breeding desirable inheritable qualities.

One of the most prominent researchers in the field of mutation research was Hans Stubbe. As a biologist in the KWI for Breeding Research in the mid thirties he was in contact with many other institutions because his research "led far

49 Kater, "Ahnenerbe", pp. 213-214.

50 Ibid., pp. 215-216.

51 The strict control of marriage choice of SS-men, education of SS-brides and Himmler's personal interest in the number of children and the family life of his men were instruments to form the SS into a social as well as a genetic elite. Himmler saw the task of the SS going towards the breeding of human beings (geht "ins Menschenzüchterische"); see: Gudrun Schwarz, Die Frau an seiner Seite. Ehefrauen in der "SS-Sippengemeinschaft", Hamburg 1997, pp. 17 ff., here: p. 20.

52 Two of these centers were situated in America and thus out of the German range of power; the remaining regions were (1) the area around the Mediterranean sea, (2) Southwest Asia (parts of India, Kashmir, Afghanistan, Asia Minor, Armenia, Kurdistan, Transcaucasia), (3) India, (4) East China, (5) Ethiopia; see Kuckuck, Wildpflanze, pp. 14-16.

into the fields of physics and medicine". He was generously financed by the *DFG* and met the interests of many high-ranking scientists.[53] The personality of Hans Stubbe is interesting in terms of the relationship between scientists and power in the Nazi era, as he was intellectually opposed to the Nazi regime and therefore experienced some disadvantages but nevertheless was able to make a considerable career. In 1936 Stubbe and two of his colleagues had to leave the Kaiser Wilhelm Institute for Breeding Research after a dispute based on political intrigue and competition.[54] He moved to the KWI for Biological Research in Berlin-Dahlem and was promoted very much by the director Fritz von Wettstein. In 1941 Wettstein backed Stubbe's nomination for director of the German-Bulgarian Institute for Agricultural Research, a KWS institution, but Stubbe had to concede to the above-mentioned Scheibe who got the job.[55] Stubbe was also considered for a chair in phytogenetics when the *Reichsuniversität Posen* was founded in 1941 as a prestige project of science in Nazi Germany; but again he was not accepted in the end.[56] In autumn of that very year, as well as in 1942, Stubbe led two expeditions on behalf of the Military High Command (*Oberkommando der Wehrmacht, OKW*) and the German Research Council in the Balkan countries in order to collect wild forms of cultivated plants.[57] A German newspaper praised the first expedition for the good cooperation between science and the German as well as the Italian army, both of whom accompanied the team. Scientists had access to the important centers of origin in the Balkans only after the German army had conquered the area. "In a sense, here science followed on the heels of the victorious weapon". The result of the trip would help to ensure Germany's *Nahrungsfreiheit* (self-sufficiency in food production).[58]

In 1943 Stubbe became director of the Kaiser Wilhelm Institute for Research on Cultivated Plants. The foundation of that institute had been proposed by Fritz von Wettstein whose initiative was supported by Konrad Meyer and Herbert Backe. Before the founding of the institute the Tibet expert Ernst Schäfer of the SS-foundation *Ahnenerbe* had requested to be integrated into the institute together with two of his colleagues.[59] Although Schäfer doubted Stubbe's political

53 See Stubbe's letter to Rudorf, 5 April 1936, MPS Archive, I, 1A, 2711/1. Stubbe mentioned as involved in his research an institute for radiation research, an institute of physics in Stuttgart as well as various hospitals (gynecological and cancer research departments) and Professor Ferdinand Sauerbruch.

54 MPS Archive, I, 1A, 2710.

55 MPS Archive, I, 1A, 2927/4.

56 Kristie Macrakis, Surviving the Swastika. Scientific Research in Nazi Germany, New York 1993, p. 122.

57 In 1941 Stubbe's team went to Albania and Northern Greece, in 1942 to Crete and the Peloponnese; see Stubbe's report to the KWS, 26 January 1943, MPS Archive, I, 1A, 2964/1.

58 Hamburger Fremdenblatt, 15 November 1941, MPS Archive, I, 1A, 2963/4.

59 Aktenvermerk Telschow (Secretary General of the KWS), 1 November 1942, MPS Archive, I, 1A, 2963/4. In his talk with Telschow Schäfer maintained that Himmler himself wanted the institute to be part of the KWS.

reliability, finally Stubbe became director of the new institute[60] while the *Ahnenerbe* established its own institute for plant genetics near Graz.[61] The original intention had been to establish only one institute for the collection and breeding of the material from the various expeditions (Hindukusch, Tibet, the Balkans) as well as from other sources such as German institutes and the stolen collections from Vavilov's institutes in Russia.[62] Vavilov himself was assumed to have been shot in 1940.[63] In the light of this fact von Wettstein believed that the Germans had to take over Vavilov's work. The Institute for the Research on Cultivated Plants, von Wettstein urged, should be the center of a network of plant collecting stations "from the polar sea to the Mediterranean area, from the Atlantic to the extreme continental region, from the sea coast to the Alps."[64] Existing institutes could also serve as branch offices, von Wettstein went on to say. So the already existing or planned institutes of the Kaiser Wilhelm Society such as those in Bulgaria, Greece and Hungary were intended to form part of the continental network which would guarantee the German control of the plant genetic resources of the continent.[65] It was urged that the institute should be established at all costs during the war because the wild forms of cultivated plants "all over the world" had to be saved. War enabled the scientists to collect plants even in regions where access could become more difficult later on, von Wettstein argued. But, on the other hand, war events, resettlements, etc. would also endanger wild plants. Therefore collection should start as soon as possible.[66]

War did not only provide access to unresearched areas of high interest to plant breeders but also to the related institutes in the enemy countries. This access allowed German scientists to usurp the collections of their foreign colleagues as well as the results of their scientific work. The *OKW* guaranteed the usurpation

60 Although Stubbe was suspected by the Gestapo he outstripped Elisabeth Schiemann, an internationally renowned scientist, formerly assistant of Erwin Baur, who was originally proposed as head of the institute; see von Wettstein's application letter to the KWS, 26 March 1939, MPS Archive, I, 1A, 2963/1. Flitner, Sammler, p. 113, interprets the rejection of Schiemann as a sign of how important participation in militarized expeditions (open exclusively to men) was for a plant breeder's career.

61 Kater, "Ahnenerbe", p. 216.

62 Arbeitsplan des Kaiser-Wilhelm-Instituts für Kulturpflanzenforschung in Wien, MPS Archive, I, 1A, 2968/2. The draft is written by Stubbe and dated (by a handwritten note) 5 April 1943. Stubbe expected further material from Spain and Portugal and from Bulgaria (via Scheibe), as well as the world's largest spelt collection arriving from Switzerland.

63 Letter of Fritz von Wettstein to the President of the KWS, 13 October 1941, MPS Archive, I, 1A, 2963/4. Vavilov was imprisoned in 1940 and died in 1943 in the prison of Saratov (Siberia), Deichmann, Biologen, p. 431.

64 Wettstein to KWS, 13 October 1941, MPS Archive, I, 1A, 2963/4. See also von Wettstein's letter to Schmidt-Ott, 21 December 1940, MPS Archive, I, 1A, 2963/3; Deichmann, Biologen, pp. 182-183.

65 Fritz von Wettstein presented this concept to Konrad Meyer as well as to Herbert Backe; Flitner, Sammler, p. 115. Comparable to the network of plant collecting stations the Senate of the KWS envisaged a network of maritime observing stations around the Mediterranean sea ("Beobachternetz im gesamten Mittelmeer") following from the establishment of the German-Greek Institute in Athens. Protokoll der Senatssitzung vom 31.7.1941, MPS Archive.

66 Draft of Fritz von Wettstein, 21 March 1941, MPS Archive, I, 1A, 2963/4. The author regretted that the Germans resettled from Volhynia and Bessarabia to the Reich had not been asked to contribute seeds of their countries of origin to the intended collection.

of all scientific institutes and seed stations in the occupied regions of the Soviet Union in autumn 1941. Because most first-class Russian scientists had been evacuated, they engaged German scientists who were talented in organization and practical affairs to manage the institutes.[67] The 35 Vavilov centers for plant collection not only aroused competition among German botanists;[68] but in general, scientists were also eager to get access to the institutes in the east as soon as possible.

Wilhelm Rudorf, Baur's successor as director in the Institute for Breeding Research, was invited in autumn 1941 by *Gauleiter* Erich Koch to oversee the research institutes of his discipline in the Ukraine. Therefore, Rudorf traveled from time to time to the occupied Ukrainian territory, which was regarded by the German agricultural planners as a rich grain reservoir that would help to overcome the German food shortage. Rudorf considered it to be in the interest of the KWI in Müncheberg that he got "insight into the Russian institutes. The chance has to be taken to get now important breeding material for which we have waited such a long time."[69] In November 1942 the Germans reopened the "former bolshevist experimental station for the cultivation of fruits and vegetables" near Minsk. The research institute stood in close connection to the KWI for Breeding Research, "exchanging experiences and receiving impulses". The institute ordained 74,000 hectare fruit plantation and 50,000 hectare vegetable gardens and was expected to breed winter-resistant fruits and provide "elite seeds to improve vegetable production."[70] The Hydrobiological Institute in the northern German town of Plön, that also belonged to the Kaiser Wilhelm Society, took over the Polish hydrobiological station at the Wigry Lake.[71] The bast

67 Rolf-Dieter Müller (ed.), Die deutsche Wirtschaftspolitik in den besetzten sowjetischen Gebieten 1941–1943. Der Abschlußbericht des Wirtschaftsstabes Ost und Aufzeichnungen eines Angehörigen des Wirtschaftskommandos Kiew, Boppard 1991, pp. 82-83.

68 See Flitner, Sammler, p. 115.

69 See Rudorf's letter to the President of the KWS, 30 March 1942, MPS Archive, II, 1A, Personalakte Rudorf.

70 Newspaper article of 13 November 1942, MPS Archive, I, 1A, 2606/1. In 1944 the branch of the KWI in East Prussia received 13,000 fruit trees for breeding experiments from Minsk (MPS Archive, I, 1A, 2723/2), presumably from the above-mentioned "former bolshevist institute" and perhaps in the context that the German rule in Minsk was not that sure anymore as was hoped the one in East Prussia would be. The theft of fruit trees from Belorussia has to be seen in the context of the extreme destruction and hunger policy in that region under German occupation, see: Christian Gerlach, Kalkulierte Morde. Die deutsche Wirtschafts- und Vernichtungspolitik in Weißrußland 1941 bis 1944, Hamburg 1999, pp. 289-291. For further examples of theft of seeds and plants by the KWI branch in East Prussia, see Flitner, Sammler, pp. 119-120. For the plundering of the Russian scientific institutes by the retreating Germans, see Müller, Wirtschaftspolitik, p. 83; for the large-scale plundering of seeds and plants by the SS see: Uwe Hoßfeld, Das Botanische Sammelkommando der SS nach Rußland 1943 oder: Ein Botaniker auf Abwegen, in: Armin Geus et al. (eds.), Repräsentationsformen in den biologischen Wissenschaften, Berlin 1999, pp. 291-312.

71 Letter of August Thienemann, director in Plön, to Ernst Telschow, 12 February 1949, MPS Archive, I, 1A, 1984/1. Letter of Telschow to Gauleiter Erich Koch, 5 August 1940, MPS Archive, I, 1A, 2858/7.

fiber institute, according to a member of its advisory council[72] in 1943, should be "prepared to work as a center for the related Russian institutes".[73] But the institute lacked personnel for this task because so many scientists "had to be handed over to the east already", not as soldiers but in leading positions in the Russian institutes now reopened under German occupation.[74] In 1942 the institute's director and one of his assistants had already traveled to the occupied Soviet territories (Estonia, Latvia). From there they brought information about the standard of the related industry as well as seeds and plants. Other plants that scientists in the bast fiber institute worked on came from the *Generalgouvernement*, Spain, Portugal and the Ukraine.[75]

The Germans took over the institutes and even brought some scientists from the occupied countries to Germany.[76] On the other hand, as mentioned above, scientists in KWS institutes during the war moved to other scientific institutions and thus became directly involved in occupation policy: For example one scholar at the Institute for Breeding Research in the rank of a military administrator (*Militärverwaltungsrat*) was sent to the agricultural research center in Kiev where he built up the agrarian university at Charkov under German occupation[77], while another moved to the research center for food and agriculture at the *Reichskommissariat Ostland* in Riga.[78] The above mentioned Klaus von Rosenstiel moved to the Ministry for the Occupied Eastern Territories where he led the department of plant breeding and coordinated all large-scale cultivation experiments with the SS.[79] One of his colleagues from Müncheberg helped to

72 The *Beirat* can be regarded as a smaller and more influential form of a board of trustees (*Kuratorium*). In the advisory council of the KWI for Research on Bast Fiber the interested industry was represented.

73 Dr. Winkler, Mayor of Sorau, where the old branch of the institute was situated in the meeting of the advisory council, 14 January 1943, MPS Archive, I, 1A, 2210/6.

74 Answer of Hering, representative of the Ministry of Food and Agriculture after the institute's director had claimed not to have enough staff for dealing with the "concerned questions in the East" ("einschlägigen Fragen im Ostraum"); meeting of the advisory council, 14 January 1943, MPS Archive, I, 1A, 2210/6. For some scientists the abundance of job opportunities in the east meant even a problem. So the director of the lake research institute, Hans Joachim Elster, was afraid to be transferred after the war to "a far away institute in the uncivilized east" which would hinder his intentions to found a family; letter of Elster to Eugen Kauffmann (chairman of the board of trustees), 18 November 1941, MPS Archive, I, 1A, 2833/2.

75 Tätigkeitsbericht für das Geschäftsjahr vom 1.4.42 bis 31.3.43 ("vertraulich", numbered copies), MPS Archive, I, 1A, 2210/7.

76 So at the Wigry station the Polish scholar Dr. Lytinski worked even under German rule. The plant-breeding institute employed prisoners of war and foreign scientists. In the bast fiber institute worked Czech migrant workers as well as Russian slave laborers (*Ostarbeiterinnen*), though not as scientists. In general Russian scientist were first checked by the German secret service in the camp Bierau of the I.G. Farben in Upper Silesia and then brought to the Reich, where they were to be treated as foreigners but not as *Ostarbeiter*. Up to March 1944 1,111 scientists and engineers together with their families were registered in the camp. Müller, Wirtschaftspolitik, pp. 332-333.

77 Dr. Friedrich Graf Mengersen, who had worked on grain at the KWI, see MPS Archive, II, 39, 63.

78 Dr. Walter Hertzsch, head of the KWI branch in East Prussia, see MPS Archive, I, 51, 10/2. In his new position he worked on the Vavilov assortment of grain, Flitner, Sammler, p. 119.

79 Flitner, Sammler, pp. 92, 116.

plunder the scientific institutes on the Crimea as a member of the *Einsatzstab Rosenberg*.[80]

Not only war but also "peaceful" expansions caused changes in several Kaiser Wilhelm Institutes. In May 1938, two months after the annexion of Austria, Rudorf wrote a report on the various plant breeding institutes and university departments in Austria and gave recommendations on how they should be reorganized.[81] After the invasion of German troops into Czechoslovakia, the Kaiser Wilhelm Society decided to transfer the bast fiber institute to the newly created Protectorate, "into the heart of a cultivation area of linen of 6,350 hectare".[82] In January 1939 the institute's director Ernst Schilling had already calculated the importance of the Sudentenland for the German linen economy.[83] For the time immediately after the (victorious) end of the war, Stubbe projected large collection trips to register the world assortment of several plants. Even during the war he assumed that there would not be enough space in his institute to cultivate all fruit trees he expected to receive from South Russia, Near and Central Asia.[84]

As can be seen from these examples, war enlarged the resources of the various institutes as well as the range of their competence. War further caused a shift in the scientific objects and questions to be researched. According to Konrad Meyer's research priorities, agricultural science was oriented towards the east – at first towards the eastern provinces of Germany – even before the beginning of the war. The KWI for Breeding Research had opened a branch in East Prussia not only for testing the cultivated plants under different conditions but also in order to breed plants adjusted to the sandy soil in the east.[85] From 1939 on this objective became even more important especially because of the war-related restrictions concerning the import of raw material. So in 1940 the KWI for Research on Bast Fiber, which like the institute in Müncheberg received about 80 per cent of its funds from the *RMEL*,[86] intensified its work on fiber plants which could grow "especially on the light soil in the east" in order to substitute the blocked import of jute, sisal, and coir.[87] One of the institute's main tasks apart from research was the testing of different sorts of fiber. During the war scientists tested parachute fabrics for the air force, worked on the improvement

80 Dr. Hermann Propach, see ibid., p. 117.

81 Rudorf's letter to Telschow, 10 May 1938, MPS Archive, I, 1A, 2608.

82 Letter of Walther Forstmann to the Ministry of Economy, 8 March 1939, MPS Archive, I, 1A, 2200/3.

83 Kurze Bemerkungen über die Bedeutung des Sudetenlandes für die deutsche Flachswirtschaft, von E. Schilling 16.1.1939, MPS Archive, I, 1A, 2200/2.

84 Arbeitsplan des KWI für Kulturpflanzenforschung (see footnote 62). Wettstein had proposed that the world's fruit assortment should be cultivated on the ground near Graz which the SS had put on Schäfer's disposal.

85 Walter Hertzsch, Die ostpreußische Zweigstelle des Kaiser-Wilhelm-Instituts für Züchtungsforschung, in: Die Naturwissenschaften 22, 1934, pp. 836-837.

86 Confidential report about the institute's work from 1 April 1938 to 31 March 1941, written in January 1942, MPS Archive, I, 1A, 2206/3. From April 1941 on Backe's ministry provided also a 142-hectare test farm for the institute in Mährisch-Schönberg; ibid. The institute was integrated in the KWS only in 1938 following a proposal of Herbert Backe.

87 Memorandum of the institute's director Schilling from 5 August 1940 addressed to the *Reichsamt für Wirtschaftsausbau* and the KWS, MPS Archive, I, 1A, 2203/2.

of military clothing and tried to improve the durability of linen compared to cotton.[88] Research projects were undertaken on behalf of the *OKW*, the Reich's Office for Economic Expansion (*Reichsstelle für Wirtschaftsausbau*) and Backe's ministry in order to find new fibers (for example from potato plants, reed, yucca etc.) and to "improve" plants suitable for the eastern territories.[89] In 1942 the representative of the *Reichsnährstand* in the institute's advisory council uttered very detailed wishes for the institute's research: linen for the region of Zichenau and Bialystok, hemp and linen for East Prussia.[90] At the same meeting the discussion dealt with the new possibilities for research opened by territorial expansion. Peace and victory, although achieved by military means, had to be completed by an economic victory, i. e. autarky for the European continent. Therefore, Germany in general and the bast fiber institute in particular, needed Russia for new sorts of bast, linen and hemp in order to find a "substitute for sisal as long as German East Africa is closed to us". The Russian linen institutes in Moscow and Leningrad and the hemp institute in the Ukraine were also of great interest for the German researchers. In his January 1942 report on the preceding years, the director stressed that war had meant a "strong impulse" to the institute's work and that the scientists were glad to have contributed to the strengthening of the German military economy.[91] A year later the speech by the advisory council's president was clearly shaped by the German defeat in Stalingrad: He explained the "tenacious Russian resistance" by hinting at the advantages of an efficient and easily manipulated Russian economy. After two more decades of development in Russia, he feared, the Germans would not have much of a chance of winning the war. Nevertheless, he was convinced that the war would end in European autarky and bring no return to the old system of overseas imports, although he doubted that Europe "even after this war would be able to dispose of the African resources."[92]

One of the most outstanding examples for the scholarly efforts for autarky is the breeding of the rubber plant. Germany had to import most of the rubber she needed. Ambitious attempts were made to raise the production of synthetic rubber in the factories of I.G. Farben; but the quality of synthetic buna was very poor and for the synthetic production a small part of natural rubber was needed nonetheless. Various institutes worked on "improving" the rubber producing

88 Letter of Dr. W. Kind to Telschow, 12 October 1939, MPS Archive, I, 1A, 2201/5.

89 In 1940 the institute tested the cultivation of certain types of linen in the recently annexed western polish provinces. Letter of Schilling to Telschow, 27 November 1940, MPS Archive, I, 1A, 2204/2.

90 Niederschrift über die 3. Sitzung des Technisch-Wissenschaftlichen Beirats am 23. Januar 1942 im KWI für Bastfaserforschung in Sorau (where parts of the institute still resided), MPS Archive, I, 1A, 2210/5.

91 Confidential report (see footnote 86).

92 Meeting of the advisory council, 14 January 1943, MPS Archive, I, 1A, 2210/6.

plant *Taraxacum bicorne* or *kok-saghyz*.[93] Russian scientists were leading at that time in this field too, and consequently the Germans were particularly interested in taking over their institutions like the *kok-saghyz* station at Minsk and the cultivated fields in the regions of Shitomir, Kiev and Charkov.[94] Immediately after the attack on the Soviet Union the SS had started searching Russia for rubber plants. The first plants were brought to Germany on October 10, 1941, followed by the plunder of recruited Russian experts, stolen literature and seeds.[95] The Kaiser Wilhelm Institute for Breeding Research had started to work on the *kok-saghyz* plant in 1938. The main objectives were to enlarge the tiny percentage of the desired raw material in this plant; to find a related indigenous plant, which could be cultivated also in less fertile soil in Germany and the *Generalgouvernement* with good results; to develop a method to extract rubber from the roots of the plant. In competition with other institutes the KWI for Breeding Research had found the most efficient way for extracting rubber. Dr. Paul Schwarze, who worked at the institute, had found a method for the serial detection of rubber content in the plants.[96] In 1943, however, Germany still produced only 200 out of the 2,400 needed tons of natural rubber. Accordingly Himmler was named "Special Commissioner for all Questions of Natural Rubber" (*Sonderbeauftragter für alle Fragen des Pflanzenkautschuks*) and attempts to raise production were intensified.[97] Problems in raising rubber output existed not only in regard to breeding but also because of the lack of manpower and the scarce cultivation area in times when the German army had to give up more and more territory in the east. As head of the Directorial Committee for Nutrition in the Office of the Four Year Plan Backe had to provide the cultivation areas. For the manpower problem Himmler found a cruel solution. In the areas of Russian partisan activity women and children should be kidnapped and locked up in camps. These camps were to be placed next to *kok-saghyz* fields and the children should be forced to work there.[98] In the KWI for Breeding Research Dr. Richard Böhme was responsible for research on *kok-saghyz*. He was a member of the Waffen-SS and had personal access to Himmler. He cooperated with Joachim Caesar, head of the agricultural department at the Auschwitz concen-

93 Alexander Schlichter, Forschung im "Dritten Reich" – Taraxacum kok-sagys. Ein Fallbeispiel, B.A. Thesis, Dept. of Biology, University of Oldenburg, 1999. Next to the KWI for Breeding Research and one department of the KWI for Chemistry, several departments of the the Four Years Plan, the *Reichsnährstand*, a Research Unit of the *Deutsche Arbeitsfront* (German Labor Front), the *Wirtschafts-Verwaltungs-Hauptamt* (WVHA, Head Office of Economic Administration) were engaged in cultivating and breeding *kok-saghyz* plants. Letter of the Head of the *WVHA* to Reichsführer SS, 12 February 1943, Bundesarchiv (henceforth: BA) Berlin-Lichterfelde, Berlin Document Center (henceforth: BDC), Hans Frank. I am grateful to Niels Gutschow for the hint on these documents.

94 See Müller, Wirtschaftspolitik, pp. 75, 81.

95 KL Auschwitz, Abt. Landwirtschaft, Bericht über die Maßnahmen, die Pflanze 4711 betreffend, 14 August 1942, BA Berlin-Lichterfelde, BDC, Hans Frank, p. 163. "4711" was the cover name for *kok-saghyz*.

96 Flitner, Sammler, p. 92.

97 Vermerk betr. Besprechung beim Reichsführer SS Himmler am 21.7.1943, BA Berlin-Lichterfelde, BDC, Hans Frank, p. 160.

98 Himmler's order, 10 July 1943, BDC Hans Frank, p. 183. Anna Zieba, Das Nebenlager Rajsko, in: Hefte von Auschwitz 9, Museum Oswiecim 1966, pp. 75-108, here: p. 101. It is not clear whether these plans were realized.

tration camp. In Rajsko, the agricultural experimental station of the camp, *kok-saghyz* was cultivated and female inmates had to analyze the rubber content in a camp-owned laboratory. In 1943 one of Caesar's employees, the German scientist Dr. Ingeburg Lehne, worked in the breeding institute in Müncheberg.[99] In 1944 Böhme's department was transferred from Müncheberg to Auschwitz. For the camp inmates this brought a serious deterioration. Mistrusting their scientific work (which indeed was something between silent sabotage and a refuge with comparatively good working conditions), Böhme removed the head of the laboratory, an inmate, and threatened her with return to the horrible conditions of the main camp.[100] Part of the research went on in the KWI, where *kok-saghyz* was cultivated at the institute's fields at the estate *Rotes Luch*. In October 1944 Russian scientists who had previously worked on *kok-saghyz* in Minsk were housed in a camp of the resettlement organization *Volksdeutsche Mittelstelle* and now researched for the Kaiser Wilhelm Institute.[101]

CONCLUSIONS

While Vavilov and Baur provided the theoretical and methodological basis, war created the material possibilities which allowed German scientists to secure an advantage in important fields. This included the prospected and never completely attained independence from food and raw material imports, as well as the control of strategically important resources in the field of science (genetic resources, wild plants) and scarce raw materials relevant for warfare such as *kok-saghyz*. This aim was intended to be reached by the systematic coordination of agrarian research as well as by using the scientific and material resources the Germans usurped during the war. But the war was relevant for scientific progress not only because of military expansion and the related plundering of scientific institutions, the recruiting of foreign scientists, and the access to botanical resources. It also played an important role in the coalition of interests between the political leadership and the scientific community: Political control of research was unnecessary as long as scientists identified themselves not necessarily with the Nazi government, but at least with the supposed national interests of their fatherland involved in a war. Furthermore, they were offered good research and career opportunities (confiscated buildings, money, professional advancement through new positions in the occupied areas, and the opportunity to exploit the scientific results of their colleagues in the occupied countries and later on of their fallen German colleagues). Research was directed towards certain questions by the classification as "important for warfare" and the related access to research funds. For this reason, the scientists adjusted their research accordingly. Those who were not recruited by the army not only had better

99 See correspondence Rudorf, MPS Archive, I, 51, 8.

100 Interview Claudette Bloch-Kennedy, who as a prisoner in Auschwitz had worked in the botanical laboratory in Rajsko; National Sound Archive, London, C410/027/01-05. I am grateful to Paul Weindling who drew my attention to this interview. Eva Tichauer, I was No. 20832 at Auschwitz, London 2000, pp. 58-77.

101 BA Berlin-Lichterfelde, NS 19, 1803, p. 42, quoted according to Schlichter, Forschung.

chances of survival but also could be sure to have better starting conditions for their future career after the war. The idea was widespread among all strata of the German population that Germany was a poor country that had been deprived of her colonies and with too small a resource basis for her large population and that war against the East was therefore justified by the necessity of obtaining food and raw material.[102] This conviction might also have played a role when German scientists of an elite institution like the Kaiser Wilhelm Society found it natural to participate in the plundering of the Soviet Union in their related research field. The KWS knew how to coordinate research in its own institutes and to support interdisciplinary cooperation. In addition, it integrated outsiders and politically suspect scientists (provided they were not Jews or politically active socialists or communists) on behalf of the national interests. I did not find any hint of an inhibition about using the possibilities provided by the army or the SS. On the contrary, even the SS-foundation *Ahnenerbe* and the agrarian experimental station at the concentration camp of Auschwitz were acceptable partners of cooperation for the elite scientists of the Kaiser Wilhelm Society.

102 Saul Padover, Lügendetektor. Vernehmungen im besiegten Deutschland 1944/45, Frankfurt/Main 1999, pp. 67, 75, 119, 124-125, 209.

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