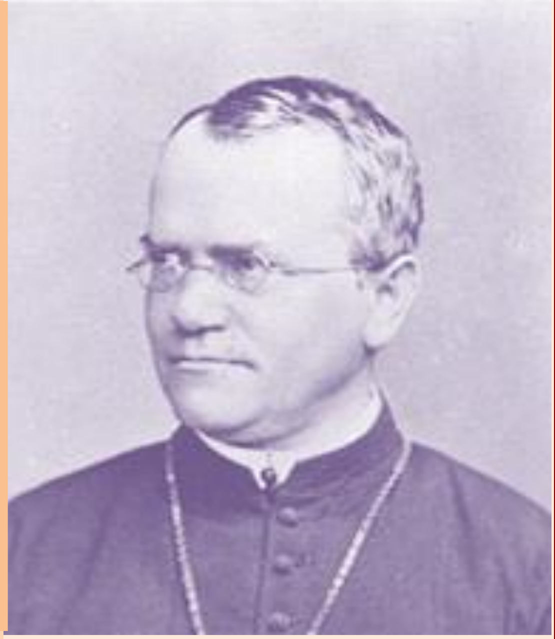
THE MENDEL NEWSLETTER



Archival Resources for the History of Genetics & Allied Sciences

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The Mendel Newsletter

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Photograph of Gregor Mendel, ca. 1860, from the Curt Stern Papers, American Philosophical Society. APS graphics:2210.

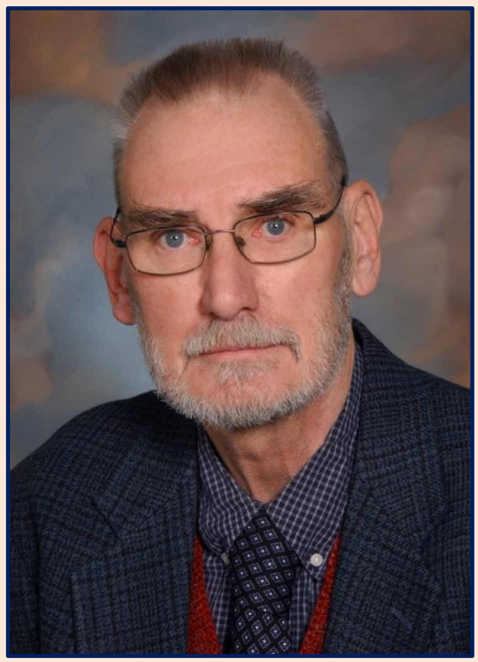
John Marius Opitz Papers at the American Philosophical Society

Charles Greifenstein
American Philosophical Society Library

IT is unfortunately a rare event when I meet someone who can pronounce my last name correctly. German speakers have no problem, and John Marius Opitz, born in Hamburg in 1935, would I assumed not have difficulty. When we met in his office at the University of Utah, he had no problem pronouncing Greifenstein. I mentioned that he would know what it means, too. Dr. Opitz swiveled on his chair and began rummaging in a low open box on his desk. He turned around and said, "Hold out your hand." Into my hand he dropped a small piece of a black mineral—obsidian?—around which I closed my fingers. Thus did this distinguished geneticist demonstrate he knew that Greifenstein derives from the German grab (or grasp) a stone.

After this pleasant introduction, I spent about a day and a half with Dr. Opitz and his assistant, Feliz Martinez, sorting through his papers, held mainly at a commercial storage facility. 135 linear feet were chosen for shipment to Philadelphia; an additional 60 linear feet of office files were recently sent. The papers cover the length of his career, though are weighted toward the last 25 years.

John Opitz with his family emigrated to the United States in 1950 and attended University High School in Iowa City. As a high schooler, he took classes at the State University of Iowa (University of Iowa), where he met Emil Witschi, a zoologist and pioneer in comparative endocrinology and sex differentiation.[1]



John Marius Opitz, December 2009

Witschi instilled in Opitz an interest in morphology. Denied the opportunity to take a doctorate following Witschi's departure, Opitz enrolled in the medical program at Iowa, staying through his residency in 1961. While there he helped set up Hans Zellweger's cytogentics lab.

There appears to be almost no material from Optiz's time in Iowa; there is more from his time in University of Wisconsin--Madison, where Opitz moved in 1961. He finished his residency and a fellowship and in 1964 received an appointment as assistant professor, rising to full professor by 1976. At Madison, Opitz's full professional interests developed. Witschi's training served Opitz well in his work with David W. Smith on malformed children and with Klaus Patau in the study of chromosome abnormalities.

One can call Dr. Opitz a pediatric geneticist, which is accurate enough, but perhaps more accurately he should be called a dysmorphologist. As interested as he is in genotypes, it is to the distinguishing of the phenotypes of abnormalities that Opitz has dedicated his career. Necessarily this means working especially with the still born, dead fetuses, babies, and children. He has identified many syndromes by phenotype, the genetic basis being discovered later, making him one of the first physicians to recognize and correlate specific groupings of paediatric anomalies with heredity.

Naturally the research files in the papers cover Opitz's work on syndromes. Among the syndromes covered are Bohring-Optiz syndrome, Opitz-Kaveggia syndrome, Opitz-Mollica-Sorge syndrome, Opitz-Mollica-Sorge syndrome, Opitz-Reynolds-Fitzgerald syndrome, Opitz-Caltabiano syndrome, and Opitz-Frias syndrome. The fact that many syndromes bear his name annoys Dr. Opitz, who feels the patients deserve the honor . He would much prefer that syndromes be referred to by the initials of the last names of patients who were first diagnosed. Opitz-Frias, for instance, is also called G syndrome.

One particularly noteworthy syndrome was first described in 1964 by Opitz and colleagues: Smith-Lemli-Opitz syndrome (SLOS). (There are more files on SLOS than for any other syndrome.) Three patients had "a distinctive facial appearance, microcephaly, broad alveolar ridges, hypospadias, a characteristic dermatoglyphic pattern, severe feeding disorder, and global developmental delay." A more extensive delineation was presented in 1969 as "RSH syndrome," the letters from the surnames of the three patients. The syndrome results from a problem with cholesterol synthesis. To quote from a paper on the subject:

> Nevertheless the primary defect remained unknown until Natowicz and Evans found that a patient with SLOS had essentially undetectable levels of normal urinary bile acids. An analysis of that patient's plasma sterols led to the discovery that the patient had a more than 1000-fold increase in the level of 7-dehydrocholesterol (cholesta-5,7-dien-3beta-ol; 7DHC), suggesting a deficiency of 7-dehydrocholesterol reductase (DHCR7), the final step in the Kandutsch-Russell cholesterol biosynthetic pathway.

Later, a gene was discovered:

> Although initial evidence suggested that the human gene for SLOS was located at 7q32.1, the human*DHCR7* gene was later cloned and localised to chromosome 11q12-13 by Moebius *et al*. Shortly afterwards, three groups independently reported apparently disabling mutations of *DHCR7* in patients with SLOS.[2]

One can get a sense the complexity of what Opitz does: astute, accurate clinical observations to finding the metabolic basis and then the genetic basis of a syndrome.

It is not surprising, then, that the Opitz Papers have extensive patient records. In fact, the research files also have patient information, such as correspondence about patients. To protect patient confidentiality, close and careful consideration will of course have to be given to the accessibility of patient records, but more so than many patient records, these are valuable due to the pioneering and clinically complex work embodied in them.

While at Wisconsin, Opitz was busy with many activities, helping much to further the growth of medical genetics. He was always a busy teacher, establishing a graduate program in genetics counseling (there are extensive teaching files in the papers). He also founded the Wisconsin Clinical Genetics Center, the patient-centered arm of what is now called the Laboratory of Genetics. Most importantly for the discipline, Opitz founded the American Journal of Medical Genetics in 1976 and remained its chief editor until 2001. (There are some editorial files in the papers.)

Despite a productive stay in Madison, Opitz left in 1979, a large reason being the "anti-morphological, anti-embryological bias" in the department.[3] He moved to Helena, Montana, to take up his work at Shodair Children's Hospital. Here, he continued his clinical work and through correspondence answered questions and assisted in diagnoses. But he was involved in other projects as well.

One project was the establishment of a genetics department at Shodair, for which he served as chair. (There are records in the papers.) Genetics counselling was a key component of the department, a program that Opitz lobbied the state government to help fund. He also directed the Foundation for Developmental and Medical Genetics while in Montana. To officially establish medical genetics as a specialty, Opitz helped secure recognition of the American Board of Medical Genetics by the American Board of Medical Specialties (ABMS) that can certify doctoral level medical genetics practitioners and clinical laboratory geneticists. But genetics was not his only interest. For example, Opitz was on the Montana Committee for the Humanities, serving as chair in 1991 and for which there are records in the papers.

Over the years Opitz has accumulated many awards, and he did so after his more to Utah in 1997. In recognition of his long and distinguished work, the American Society of Human Genetics gave him its most prestigious award, the William Allan Award, in 2011.

More could be said about Dr. John Opitz and life and work represented in his papers. His interest in history and knowledge of languages has allowed him to take a long view of his studies. His connections with other scientists with his interests are wide-ranging and deserve exploration by historians. His work has offered hope to families and patients who would have little of it without Dr. Opitz's care and dedication. The care and dedication are evident in his papers.

Notes

1 Along with his papers Dr. Opitz donated to the Library the surviving papers of Witschi, of which he had custody. Futhermore, Opitz also gave the Library the papers of Charles Cotterman which were also in his keeping.

2 Kelley, Richard I., and Raoul C. M. Hennekam. "The Smith Lemli-Opitz Syndrome." Journal of Medical Genetics (2000) 37:321-35. Retrieved Mar. 12,2015. http://jmg.bmj.com/content/37/5/321.full#ref-19. Natowicz and Evans made their discovery in 1994, thirty years after the first description of SLOS.

3 Opitz, John. "Forty-four Years of Work in Morphology." Biographical files, Opitz Papers.

Collection Contact Information

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Animal Genetics Collections at Edinburgh University Library Special Collections

Clare Button

EDINBURGH and its environs have been home to animal breeding and genetics research from the early twentieth century, and its history ranges from applied animal breeding and livestock improvement to cloning, transgenics and regenerative medicine. Although many of the research organisations have existed due to scientific or government funding bodies, the University of Edinburgh has played a crucial role over the past century, spanning the creation of a lectureship in genetics in 1911 through to the merge with the Roslin Institute in 2008. Fortunately, this long-standing relationship has led to the survival of many archive collections within the University Library's Special Collections, which hold the personal papers of scientists, records of research organisations, thousands of published papers and reprints, and collections of rare books. Relatively unusually for such collections, there are also a plethora of objects: a stunning collection of 3,500 glass plate photographic slides, a 'pig's cup' trophy, and even a collection of signs from various buildings. Together, these collections are a rich resource for understanding the scientific work, material culture, and social and institutional history of over a century of animal genetics and related research in Scotland's capital.

Acquisition and Funding History

In 2011, Edinburgh University Library (EUL) Special Collections gained a grant from the Wellcome Trust's Research Resources in Medical History funding stream[1] to catalogue and preserve the animal genetics material in EUL Special Collections. This grant scheme targets institutions such as libraries, museums and archives, which hold collections of value to the scientific and medical humanities that are in need of cataloguing and preservation. The two-year grant employed a Project Archivist (myself) and a Rare Book Cataloguer (Kristy Davis), to catalogue the personal papers of zoologist James Cossar Ewart, developmental biologist and geneticist Conrad Hal Waddington, the printed, rare book and slide collections, the records of the Institute of Animal Genetics and a small amount of records from the Roslin Institute. However, no sooner had the grant been received than it became clear that we had only seen the tip of the iceberg. As well as becoming formally part of the University of Edinburgh in 2008, the Roslin Institute had also moved to a new site, and colleagues at EUL were alerted that more or less the entire filing system of the Institute would need a new home. A rescue mission was made to the rapidly emptying old site, where boxes and filing cabinets were being stored in disused poultry huts. Around 200 linear metres'

[1] Wellcome Trust, http://www.wellcome.ac.uk/Funding/Medical-Humanities/funding-schemes/support-for-archives-and-records/index.htm (accessed 06 October 2014)

worth of material was recovered, representing the organisation's history dating back to the 1940s.

Shortly afterwards, further acquisitions were made of the papers of Professor Sir Ian Wilmut, well-known as the head of the research team which cloned Dolly the sheep at the Roslin Institute in 1996, and substantial archives of scientists like the protozoan and malaria geneticist Geoffrey Beale and reproductive physiologist Richard 'Alan' Beatty. After a small grant which enabled a consultant archivist and conservator to scope the likely timescale and costs of cataloguing these recent acquisitions, a second grant application for a further two year project was made, and proved successful. The grants have enabled the material to be rehoused in archival quality folders and boxes, for conservation work to be carried out on particularly fragile items, such as glass slides and early rare books, and for catalogues to be made to international standards and mounted online on a dedicated project website.[2] A project blog was also developed, which aims to draw out the individual stories behind certain items or individuals within the collections.[3]

Recently, a third Wellcome Trust grant was received to digitise the unique collection of glass photographic slides, which will be made freely available on EUL's Images database.[4]

Research Interests

The collections are as diverse in subject matter and research potential as they are large in scale. Historians of science will find a largely unbroken narrative of how animal genetics developed in Edinburgh from its nineteenth century roots in natural history to the recent work in genomics and transgenics. The records of the Roslin Institute are rich in detail about the the growth of the biotechnology industry, as witnessed by companies such as PPL Therapeutics, while any researcher interested in how legal cases surrounding intellectual property have formed the modern face of commercial scientific research will also find much of value. The collections also have applications to ongoing scientific work. Scientists have accessed the collections to gain a contextual understanding of the development of ideas in their particular field of research, while retired researchers have accessed their own historical papers and collected data to conduct retrospective appraisals of their work.

The collections are visually rich, an aspect not always associated with scientific records. Of most obvious aesthetic interest is the glass slide collection, which spans approximately the period 1870-1930. The collection has no obvious provenance, but certainly contains slides connected with University professors of natural history, agriculture and rural economy. Their original teaching purpose now defunct, the slides exist today as a stunning and unique photographic record of different domestic animal breeds, many of which no longer exist, as well as scenes from around the world, apparently collected on research trips. Pictures of prize bulls and pigs sit alongside portraits from Maori and African communities, cowboys sitting around a campfire, Chicago cattle yards, and the Egyptian Pyramids. The slides reveal much about ethnology, costume history and early techniques of photography, but also shed light onto research into early animal breeding research around the world.

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[2] Edinburgh University Library Special Collections, 'Towards Dolly' project website, http://www.archives.lib.ed.ac.uk/towardsdolly/ (accessed 06 October 2014)

[3] Edinburgh University Library Special Collections, 'Towards Dolly' project blog, http://libraryblogs.is.ed.ac.uk/towardsdolly/ (accessed 06 October 2014)

[4] Edinburgh University Library, Centre for Research Collections, Image Collections website, http://images.is.ed.ac.uk/ (accessed 06 October 2014)

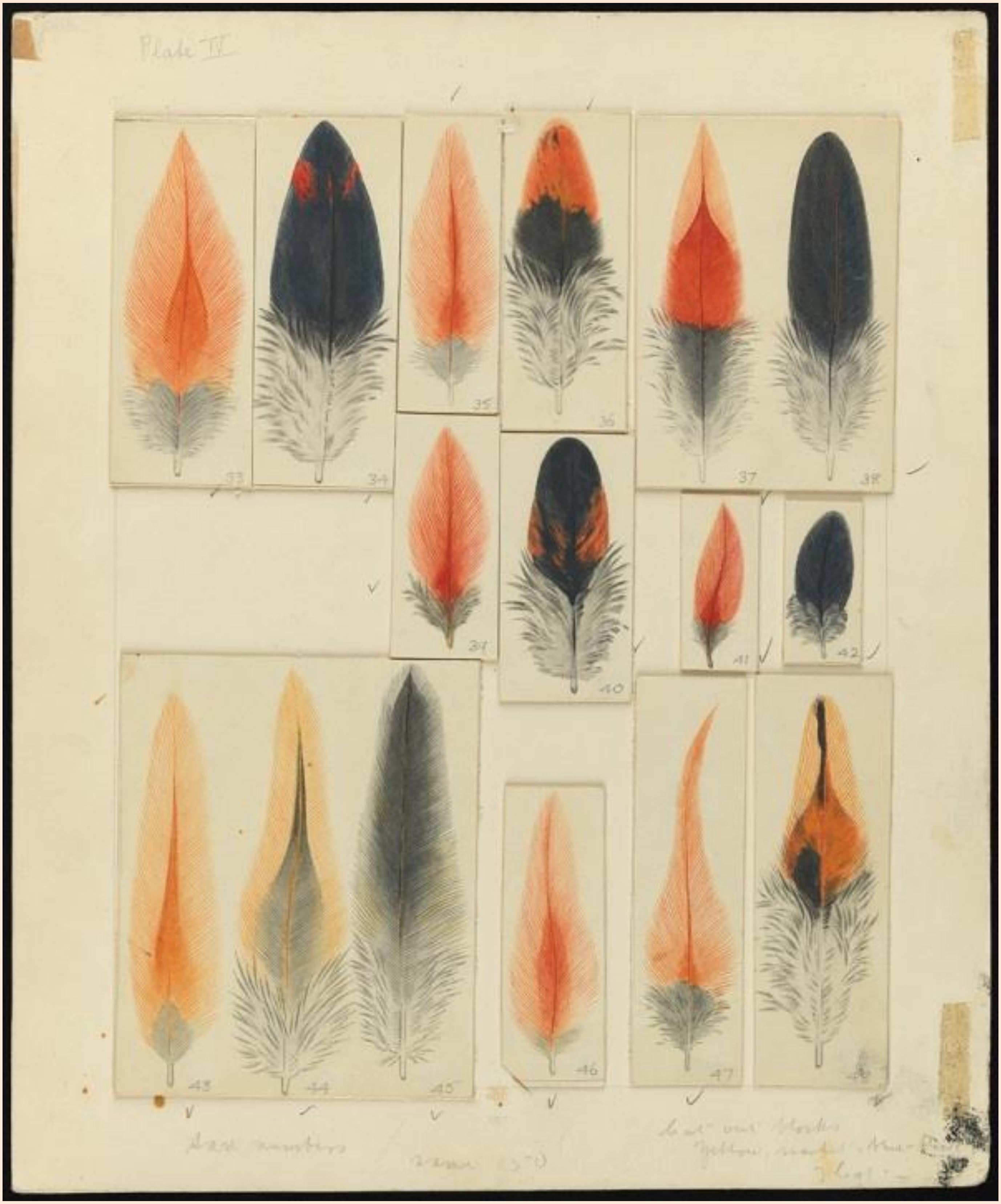

Figure 1. A feathers sample showing the plumage of the brown leghorn foal, used in an article by J.P. Chu (*c.* 1938).

Scientific research never occurs in a vacuum, and the collections reveal the complex and interconnected network of communications between scientists from the early days of genetics, not least in the voluminous correspondence. Many books and reprints bear the inscription of William Bateson, who first coined the term 'genetics' in 1905, and who is known as the father of genetics in Britain. These items were probably loans or gifts to individuals in Edinburgh who knew Bateson, such as natural history professor James Cossar Ewart or F.A.E. Crew, the University of Edinburgh's first professor of genetics. The cataloguing process has captured these interconnections via the indexing of authority terms such as person or place name, as well as recording related archival collections existing in other institutions.

Of course, the history of science can be approached from any number of angles, two among them being the institutional and the personal. I will now briefly explore these two perspectives, both of which have much to reveal, but which have so far been relatively underexplored in the context of Edinburgh's genetics history. It is hoped that the increased availability of these collections will help to expose a rich seam of research opportunities in this area.

Institutional Papers

The institutional history of animal genetics research in Edinburgh consists of numerous interlocking and overlapping strands, and changes of names, structures and governance. But beneath the complexity lies a strong narrative thread which can be traced over the course of a century, and these archival collections are key to unlocking this.

When the University of Edinburgh established its lectureship in genetics in 1911, it created the first academic post in the science in Britain, a year before the Balfour Chair of Genetics at Cambridge University, and just over a decade after the rediscovery of Mendel's laws of inheritance. Appointed to the position of Lecturer was Arthur Dukinfield Darbishire (1879-1915), who had been trying to steer a middle way through the often bitterly opposed theories of the biometricians and the Mendelians. Darbishire's appointment came at a time when discussions were taking place throughout Britain about the creation of an 'animal breeding research station' to apply classical genetics to livestock improvement. The intervention of the First World War meant that discussions did not reopen until 1919, by which time Darbishire had died in military camp. The position of director was offered to F.A.E. Crew (1886-1973), who as a medical student had attended Darbishire's genetics lectures and been fascinated by them. Crew soon proved to have the force of personality and directorial acumen to transform a miniscule budget and initial lack of building, staff and students into a world-renowned research institution. There was a requirement to conduct research into animals of economic importance that would be of practical use to farmers and breeders, so studies of the milk yield of cattle and the improvement of the fleece of sheep existed alongside classical genetics work with the fruit fly Drosophila. As the years went on, the Institute of Animal Genetics, as it was renamed in 1930, played host to scientists from around the world.

Despite its fascinating early history, the records of the Institute of Animal Genetics are sparse, consisting of merely four boxes. There is next to no paperwork from the first six to eight years of the Institute's existence, and the earliest governing committee minutes date from 1928. This could partly be due to Crew's avowed dislike of administration and paperwork (he claimed to have kept a tame goat in his office trained to consume any official correspondence!)[5], partly to the complex and rather ad hoc governance of the early years, and partly to the ravages of time. However, the records which do survive provide colourful insights into the professional and social atmosphere of the Institute's early days, which Crew described as being 'filled with passionate

[5] Edinburgh University Library Special Collections, Science Studies Unit: Interview with F.A.E. Crew, Acc 95.028 (1969), Tape 1, Side 2

excitement as hypothesis chased hypothesis.'[6] A beautifully preserved visitors' book contains signatures and personal messages from researchers and visitors from around the world, and evocative photographs of staff and visitors taking an elegant al fresco afternoon tea on the roof of the University's Chemistry Department. A collection of early press cuttings reveal Crew's impressive one-man PR machine; from his first days as director he cannily used the press and media to spread awareness of the work of the Institute and to make contacts with farmers and livestock breeders as well as wealthy benefactors.

As with the end of the First World War, the close of the Second engendered a government-led initiative to encourage research into agricultural improvement, partly arising from the British food shortage crisis of the war years. A new national animal breeding research organisation (NABGRO, later ABRO) was proposed, funded by the Agricultural Research Council (ARC). Although the headquarters would be based in Aberystwyth, Edinburgh seemed the ideal location for the genetics section of this new organisation, with Conrad Hal Waddington (1905-1975) being appointed director in 1947. ABRO would maintain a close relationship with the Institute of Animal Genetics and with the University of Edinburgh. Waddington occupied the Chair of Animal Genetics vacated by Crew, who had departed to take up the Chair of Public Health and Social Medicine at the University. At this time, the poultry research section of the Institute separated off to become a separate ARC organisation, the Poultry Research Centre. Its director was Alan Greenwood (1897-1981), who had been acting director of the Institute during the war years.

Waddington had a famously laissez-faire directorial style, but this approach did at least continue to encourage the freedom of research topics fostered by Crew. Waddington's Institute harboured a series of individual research units, often funded by specific bodies and grant schemes. There was the Protozoan Genetics Unit under Geoffrey Beale (who held a Royal Society Professorship), a Medical Research Council Mutagenesis Unit under Charlotte Auerbach, and the ARC Unit of Reproductive Physiology under Richard 'Alan' Beatty and Anne McLaren. The detailed and entertaining staff photographs which exist in the various collections speak eloquently about the day-to-day work of researchers as well as the social aspects of life in Edinburgh's genetics community. Among the posed and somewhat stereotyped photographs of the white-coated scientist at the microscope and attendants weighing out hen's eggs, usually taken for newspaper articles, there exist informal snaps of staff parties, jokey pastiches, and pictures of a 'Drosophila ballet' choreographed by the Institute staff. There are even crackly vinyl LPs of Institute staff performing comic genetics-related ditties set to popular tunes of the day, accompanied by copies of the Institute 'songbook'. One such song, 'The Old Time Gene' harks back to a simpler, pre-molecular age, where 'the chromosomes were necklaces, the gene a simple pearl'!

The 1970s and 1980s were hard times for research, which those institutional records concerning 'streamlining' and potential redundancies testify. In 1986, a reordering of government institutes led to ABRO becoming the Edinburgh Research Station of the Institute of Animal Physiology and Genetics Research (IAPGR), with the second Station based in Babraham, Cambridge. This arrangement continued until 1993, when the Edinburgh Research Station, based in the village of Roslin outside Edinburgh, split from Babraham to become the independent Roslin Institute.

The records of the Roslin Institute, which form the largest collection, are exhaustive in details about the organisational activities of the Roslin as well as its predecessors, including ABRO, PRC and IAPGR. As well as the top-level governance records such as director's reports and committee minutes, files can cover anything from

[6] F.A.E. Crew, unpublished draft autobiographical notes, Edinburgh University Library Special Collections, EUA IN1/ACU/A1/4/2, (1968) p.7

archaeological excavations taking place on experimental farms, correspondence with solicitors about legal cases arising from particular projects or ventures, and entries for children's writing competitions on the theme of Dolly the sheep. Records from the late 1980s reveal the process of rationalisation and its impact on funding, staff and strategic vision. Legal records show science research taking an increasingly prominent place on the public stage, with implications for commercial interests as well as revolutionary possibilities for animal and human health. The direct results of published research can be traced through the impressively collected and bound staff papers, collected systematically from 1947, while samples of the vast amount of raw data which originally came to Special Collections are fascinating examples of how data collection and technology has altered over time.

One needs to examine the whole of Edinburgh's institutional contexts in animal genetics to understand any one part of it. For example, Crew's insistence in the 1920s that reproductive physiology should remain a key part of genetics teaching and research at the Institute in part p aved the way for Ian Wilmut joining ABRO in 1973 and embarking on research which would lead to the Roslin Institute's ground-breaking cloning and transgenics research. Decisions and trends which direct an entire institution can be the result of individual decisions, actions and personalities; and it is the role of the individual to which I now turn.

Personal Papers

It has been said that science is about individuals, not just institutions. Certainly, the roots of genetics research in Edinburgh rests at least in part on one person: James Cossar Ewart (1851-1933), whose personal papers are the earliest collection catalogued during the projects. Ewart was professor of natural history at the University of Edinburgh from 1882 to 1927, and he is best known for his cross-breeding work with zebras and horses, published in 1899 as the Penycuik Experiments. Ewart was a pioneer in his active experimentation and practical applications of scientific theory, and his work helped put Edinburgh on the map when it came to choosing a location for an animal breeding research station. But even before then, Ewart, along with William Bateson and F.H.A. Marshall, had been lobbying the government for an investment in a 'biological research institute' following the rediscovery of Mendel's laws in 1900. Ewart was also responsible for establishing the lectureship in genetics at the University in 1911, and his extensive correspondence indicates the extent of his work and influence in grooming Edinburgh for its future role as a centre for dedicated animal breeding and genetics research; a role which has been somewhat underexplored in historical research.

The personal papers of individual scientists are not only rich in detail about their personalities, but also about their fields of study. Waddington's own archive can barely keep up with the imaginative breadth of the man's intellectual interests, let alone his administrative duties, and its 57 boxes are full to bursting with correspondence covering his involvement in conferences, congresses and think tanks around the world, his publications, lectures, television appearances and his myriad duties as director and professor. Yet there is still space for intimate, sometimes poignant, touches: a copy of a schoolboy essay on 'Alchemy', meticulously illustrated with occult and ancient symbols, Waddington's early laboratory notebooks, and a folder of miscellaneous papers found on his desk at the time of his death.

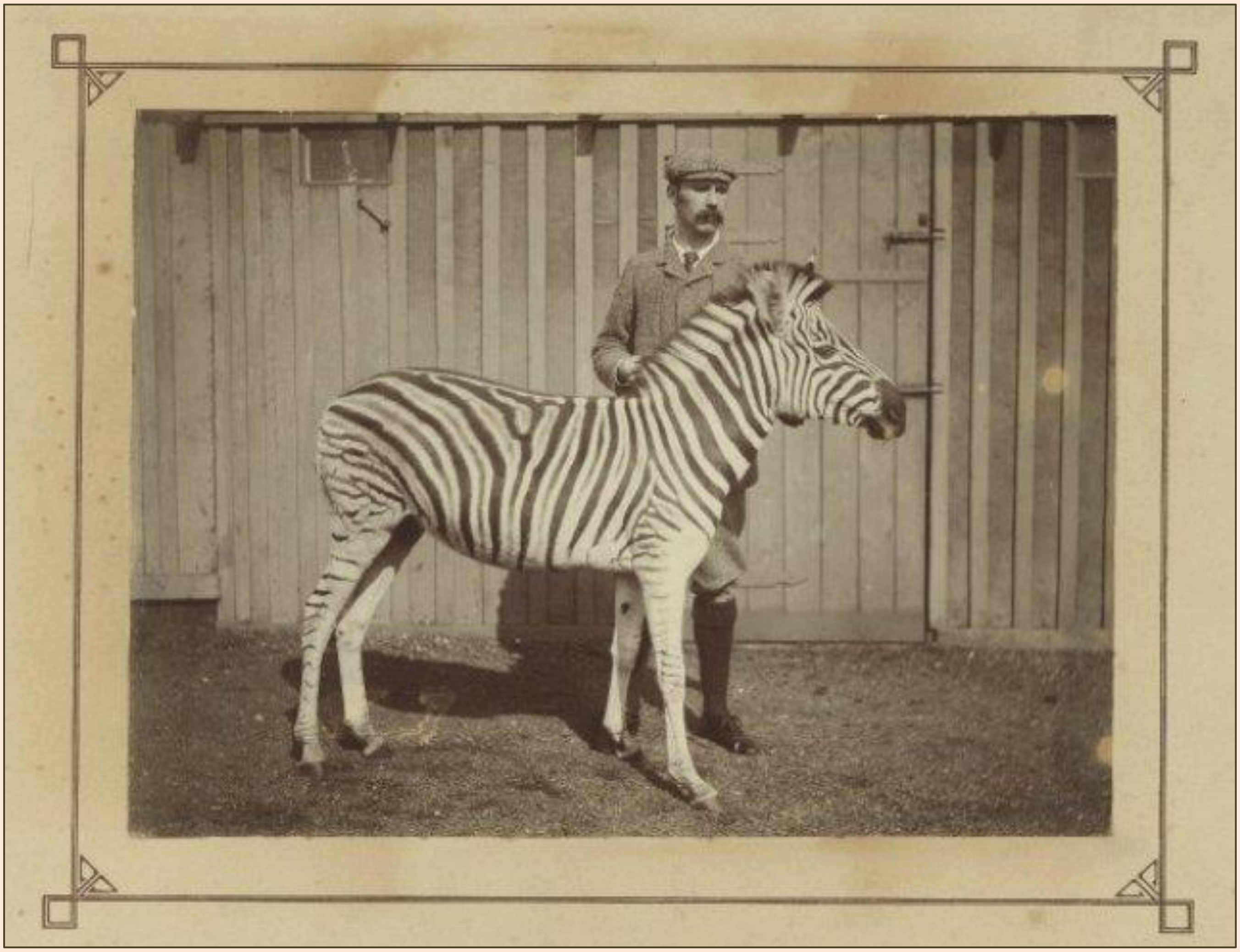

Figure 2. James Cossar Ewart and a zebra (*c.* 1899).

The scientists who worked under Waddington in their distinct research units were often responsible for gaining and maintaining their own independent funding streams, and the papers of Geoffrey Beale (1913-2009) and Alan Beatty (1915-2005) are brimful of funding application forms to various bodies, such as the Medical Research Council, the Agricultural Research Council, and the World Health Organisation, as well as related correspondence questioning negative funding decisions or chivvying other colleagues to hurry up and submit their part of the application. Nowadays of course, funding applications are the bread and butter of any active researcher, no matter how senior, to which Ian Wilmut's recent archive pays testament.

Scientists' personal papers can often refreshingly contradict the 'official' story which may exist elsewhere. Charlotte Auerbach (1899-1994) is chiefly remembered as the discoverer of mustard gas mutagenesis, but in her lifetime she disagreed vociferously that this was her chief scientific discovery, writing to a colleague in 1976: 'You are quite right that I have my own ideas about what have been my main contributions to science, and that I should like to be remembered for these and not for the wrong ones…First, I do not think that I should get much credit for having been the first to find an effective chemical mutagen…What I think are my merits are these:- I am terribly thorough…Without being especially fertile in ideas myself, I am very critical of those of others and

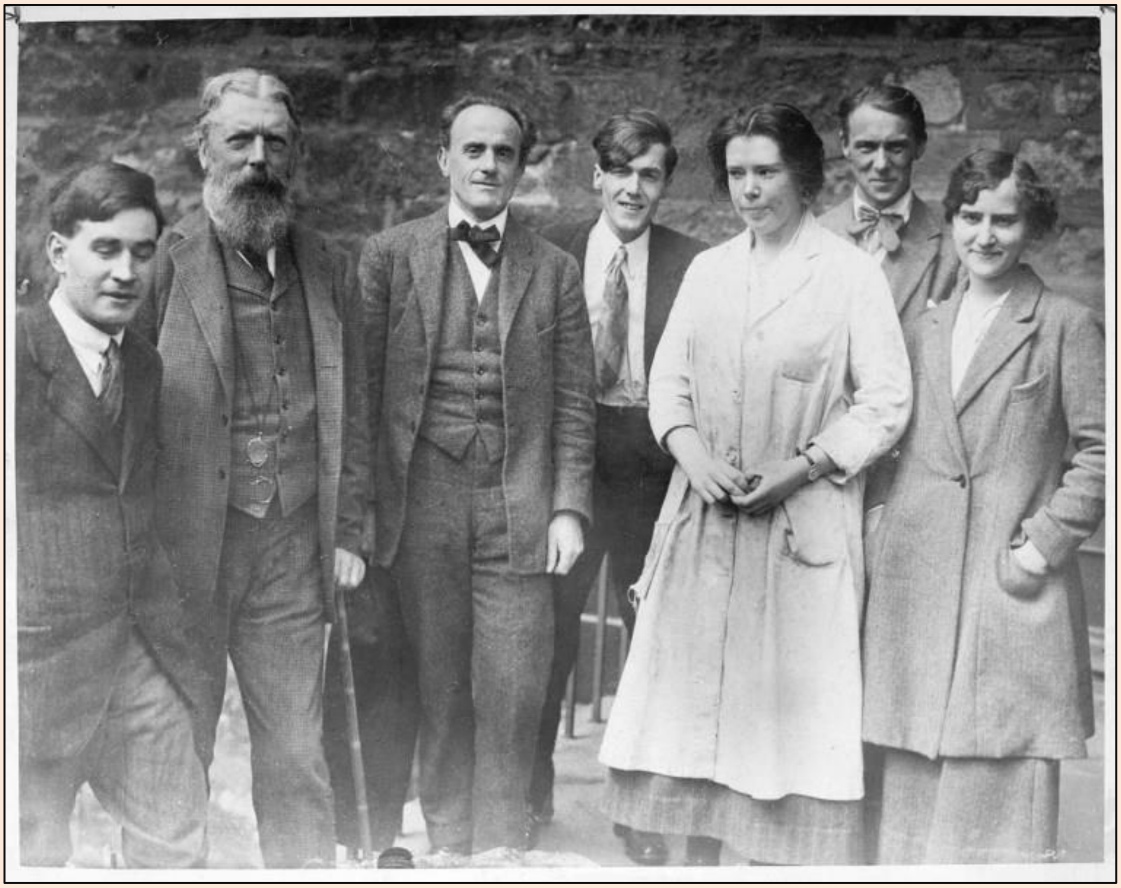

Figure 3. F.A.E. Crew and various visitors to the Institute of Animal Genetics (*c.* 1924).

particularly of the unproved application of fashionable interpretations to one's data…I have always retained my attitude as a biologist and have never, like many other mutation workers, abandoned the biological approach in favour of a purely chemical one.'[7]

Autobiographical memoirs, where they survive, can be invaluable for putting flesh to the bones of the working scientific life captured in personal papers. Informal and unpublished memoirs exist for Geoffrey Beale, F.A.E. Crew and Alan Greenwood, and all overflow with entertaining personal reflections and anecdotes. We hear, for instance, how Crew reportedly trained his experimental chickens to walk downstairs to the basement each night to avoid disturbing the neighbours with their crowing. These personal recollections, as well as giving us valuable humorous, emotional and anecdotal insights, can also help to fill out 'gaps' in the documentary record, particularly with key individuals such as F.A.E. Crew, whose papers have unfortunately either not survived, or not yet come to light. Our historical understanding of Crew has been greatly aided by the lengthy (nearly 8 hours) interview with Crew recorded between 1969 and 1971 by the Science Studies Unit under director David Edge and his assistant Margaret Deacon. This recording forms part of a wider oral history project which interviewed many of the main individuals involved with the early days of genetics in Edinburgh, and it has inspired us to begin our own similar project.

The unique value of oral histories to capture a purely individual perspective on a life, career or working environment has led to a series of contemporary recordings being made with current scientists, including Grahame Bulfield, William

[7] Edinburgh University Library Special Collections, Papers of Charlotte Auerbach, Coll-1266/5/7.

G. Hill and Gerald Wiener, with more to come. Subject to approval from the rights holders, we hope to be able to mount the interviews online, to complement the catalogued archival and printed material from that period.

Finally, mention should be made of what might be termed ‘satellite collections’ which fall outwith the scope of these funded projects but which complement the animal genetics collections. Chief of these are the hundreds of film reels from Eric Lucey’s one-man Genetics Film Unit, which operated from the 1950s onwards. As well as footage of Waddington and colleagues lecturing, the reels include Lucey’s acclaimed films The Jump of the Flea and Shoreline Sediments and others which reflect his diverse interests and commissions, including a stop-motion study of Edinburgh’s Princes Street in the 1960s. These films need to be digitised in order to be made fully available. When they are, an entirely new facet of research will be opened up.

Conclusion

It is well-nigh impossible to convey satisfactorily the depth and range of subjects covered by the animal genetics collections at EUL Special Collections. Nothing has been said here of the richly detailed information which can be found concerning the scientific work itself, which is the backbone of each and every research institution and of every scientist’s career. What has emerged overwhelmingly throughout the projects is the narrative thread of animal genetics in Edinburgh, from the late nineteenth century through to the present day. This thread of course touches upon many different areas of research, and these projects have created opportunities for Special Collections to begin collecting in other related sciences, including human genetics and molecular biology. It is to be hoped that this will both encourage and facilitate historical research into this rich seam of Edinburgh’s scientific history.

A Note on the Arrangement of and Access to the Papers

The animal genetics collections consist of around 100 linear metres of material in all, within which are 14 discrete collections, of a variety of media, including objects, glass slides, papers, rare books, photographs, floppy discs, audiovisual material and artwork.

The material has been catalogued and conserved as part of two projects funded by the Wellcome Trust: ‘Towards Dolly: Edinburgh, Roslin and the Birth of Modern Genetics’ and ‘The Making of Dolly: Science, Politics and Ethics.’

Cataloguing of the archival material was carried out by the Project Archivist, Clare Button, while Rare Book Librarian Kristy Davis catalogued the printed material and glass slides as part of the ‘Towards Dolly’ project. Conservation work on glass slides and some printed and archival volumes was carried out by Caroline Scharfenberg and Anna Trist.

EUL Special Collections are fortunate to have two academic advisers on the project board; Dr Steve Sturdy, Head of Science, Technology and Innovation Studies at the University of Edinburgh and Professor Grahame Bulfield CBE, former director of the Roslin Institute and Professor Emeritus of Genetics at the University of Edinburgh. They have been able to provide informed perspectives and expert interpretation beyond the remit of a librarian or archivist, and these projects would have been immeasurably poorer without their input.

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Rethinking Russian Studies on the Genetics of Natural Populations: Vassily Babkoff's Papers and the History of the 'Evolutionary Brigade', 1934 –1940*

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THE prominent science historian Vassily Babkoff (1946–2006), whose scholarly interests ranged from the scientific ideas of Russian futurists to the history of eugenics and medical genetics, is mainly known for his profound study of Sergei Chetverikov's 'school' of evolutionary genetics.[1] In the mid-1920s, Chetverikov, together with his students and younger researchers from Nikolai Kol'tsov's Institute of Experimental Biology in Moscow, started a systematic study of the genetics of wild populations of *Drosophila*.[2] Following Chetverikov's arrest by the secret police in June of 1929, his group disbanded, effectively ceasing to exist. However, five years later Chetverikov's disciple Dmitrii Romashov organized a new group; known as the "Evolutionary Brigade" (from 1938 the "Evolutionary Laboratory"), the group did important work on the genetics of 'natural populations' (*prirodnye populiiatsii*) of several *Drosophila* species between 1934 and 1940. Unlike Chetverikov's earlier research, the work of Romashov and his 'Brigade' has not yet been given sufficient attention by historians of science. Vassily Babkoff is the only scholar who explored the group's history in his 1985 book, making extensive use of Brigade's papers that one of its former members donated to him in the 1970s or early 1980s.

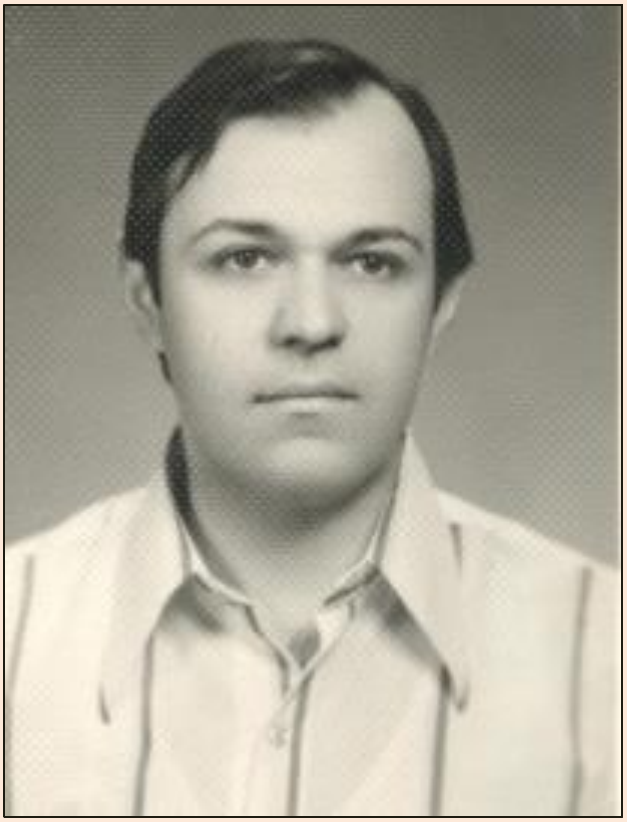

Figure 1. Vassily Babkoff (1946–2006), a Russian historian of science who collected and preserved the documents of the "Evoolutionary Brigade." *(Nikolai Vavilov Memorial Museum)*

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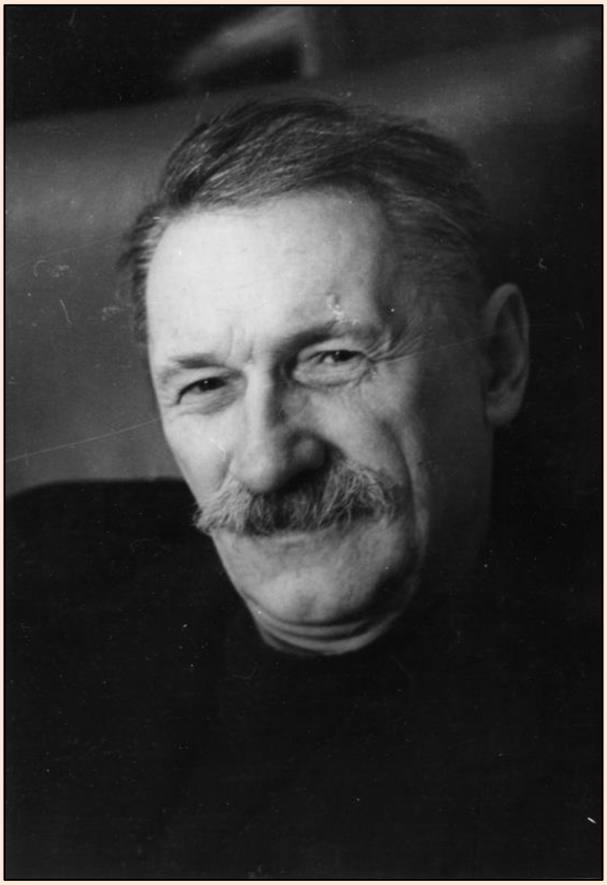

Figure 2. Dmitrii Romashov (1899–1963), a Russian geneticist who described, together with Nikolai Dubinin, the "automatic genetic process" in small, semi-isolated populations, and organized the "Evolutionary Brigade" at the Institute of Experimental Biology in Moscow in 1934. *(Nikolai Vavilov Memorial Museum)*

After Babkoff's premature death the documents of the Brigade, including its scientific reports and the minutes of meetings, became part of the archival collections of the Nikolai Vavilov Memorial Museum at the Moscow Institute of Genetics.

The documents from Vassily Babkoff's collection reflect important institutional changes: despite its odd-sounding name, the Evolutionary Brigade was part of Kol'tsov's Institute of Experimental Biology, while Chetverikov's earlier group was an informal association of researchers who met in private apartments and held no records of their meetings. The name that Chetverikov's students chose for their improvised seminars—DrozSoor—was an abbreviation for *sovmestnoe oranie drozofil'shchikov*[3], which can be loosely translated as "the drosophilist screeching society". The communal spirit and the absence of scholarly pedantry were important elements of Chetverikov's interdisciplinary approach, which combined laboratory experiments with the study of populations in the field. However, holding sessions in private apartments and having closed membership had its costs—the meetings of DrozSoor started to look increasingly suspect in the late 1920s when the Soviet government orchestrated a series of show trials against engineers and other members of the 'bourgeois intelligentsia', accusing them of conspiracies and 'wrecking activities'.

After the secret police arrested and exiled Chetverikov, it intimidated his disciples, interrogating Sergei Gershenzon and Piotr Rokitskii; as a result, both researchers ceased collaboration with their former colleagues, abandoning genetic and evolutionary research on natural populations of *Drosophila*. It is likely that the threat of prosecution caused two more students of Chetverikov, Nikolai Beliaev and Boris Astaurov, to leave Moscow and move to Tashkent, switching from *Drosophila* genetics to the genetics of silk worm; Beliaev would later be executed as an 'enemy of the people' in Tiflis where he moved from Tashkent in the early 1930s.

Thinking about the Evolutionary Brigade as the institutional successor to DrozSoor raises a larger historical question about the nature of the Russian geneticists' persistent interest in natural populations of *Drosophila*. Starting his project roughly ten years before Theodosius Dobzhansky, John T. Patterson, and Cecil Gordon began similar studies in the US and Britain[4], Chetverikov and his group had found numerous recessive mutations in wild populations of *Drosophila*. Analyzing the results obtained by Chetverikov's group, Dmitrii Romashov pointed out in his 1931 article that different local populations contained high concentrations of different mutations. These interpopulational differences could not

Figure 3. Chetverikov with his students, *c.* 1926–1929. *Left to right*: Sergei Gershenzon, Dmitrii Romashov, Sergei Chetverikov, Boris Astaurov, Alexander Promptov, Chetverikov's wife Anna Sushkina, Nikolai Beliaev, and Elizaveta Balkashina. *(Nikolai Vavilov Memorial Museum)*

be shaped by selection because most of mutations were deleterious or neutral, nor could they be due to the mutation process itself. Together with Nikolai Dubinin, a new colleague who led the Genetics Department at the Koltsov Institute since 1932, Romashov developed a theory of 'automatic genetic processes' that can randomly raise concentrations of mutations in small, semi-isolated populations.[5] Crediting Romashov and Dubinin for the independent discovery of random genetic drift, historians and evolutionary biologists have mostly ignored the historically important difference between Sewall Wright's understanding of the evolutionarty role of drift and the ideas of Romashov and Dubinin—according to Wright, random drift created novel interaction systems of genes[6], while, in Romashov's and Dubinin's view, the stochastic processes only raised concentrations of the individual genes and mutations, making them subject to natural selection.

The discovery of the 'automatic genetic processes' that we will hereafter refer to as 'drift' had a profound impact on the work of the Evolutionary Brigade, attracting the researchers' attention to the importance of local populations for understanding evolution. The documents that we describe and examine in this paper demonstrate the geneticists' interest in the detailed, comparative study of wild populations of different *Drosophila* species. It is likely that this 'naturalistic turn' led to disagreeements with Nikolai Dubinin, whose main interests lay in experimental genetics, with articles on evolutionary genetics forming only a small part of his scholarly output in the 1930s. Apparently, the members of the Brigade remembered too well the dismal fate of DrozSoor, organizing the new group as a formal department within Koltsov's Institute when they held their first meeting at the Institute on 28 October 1934. It is also remarkable that the word 'brigade' had a distinct political connotation—the brigades of 'shock-workers' that emerged in Soviet industry in the early 1930s set a model of enthusiastic, 'Socialist' labor with newspaper reports praising the 'brigades' of writers, visual artists, or scientists who worked collectively on important cultural and economic projects.

Description of the Archive

The papers of the Evolutionary Brigade were donated by the heirs of Vassily Babkoff to the Institute of Genetics, Russian Academy of Sciences, in August 2010. The documents may now be accessed at the Institute's Nikolai Vavilov Memorial Museum (for-

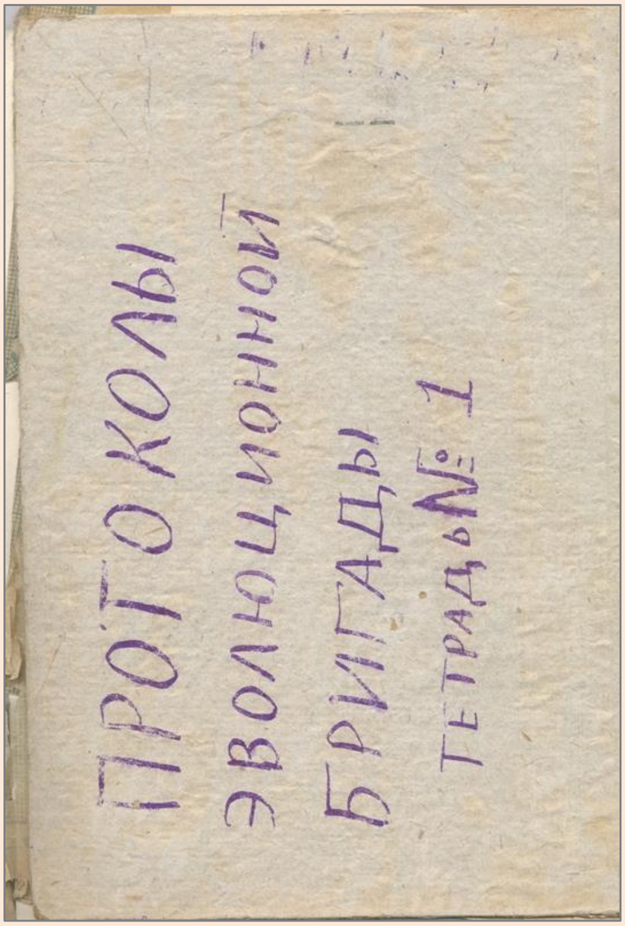

Figure 4. Minutes of the Evolutionary Brigade, cover page. *(Nikolai Vavilov Memorial Museum)*

merly the History of Genetics Department), which holds archival collections of a number of Russian geneticists. The major restructuring of the Academy of Sciences that began in the Summer of 2013 may eventually lead to the Museums's reorganization or closure with archival collections being transferred to the Russian Academy of Sciences Archives. The collection is not catalogued; this article provides the first description of its materials.

The handwritten minutes from the 104 meetings of the Evolutionary Brigade occupy two notebooks, covering the period from 28 October 1934 to 4 April 1940. The minutes of the founding meeting of the Brigade indicate that the group included three former Chetverikov's disciples, members of DrozSoor: Dmitrii Romashov, his wife Elizaveta Balkashina, and Alexander Promptov, as well as two younger geneticists: Alexander Malinovskii, a graduate student and employee at the Koltsov Institute from 1931, and Valentin Kirpichnikov, who started to work at the Institute from 1932. After the 17th meeting, held on 17 March 1935, there was a hiatus in the group's work due to the arrest of Balkashina and the mental illness of Romashov. Balkashina's 'crime' consisted of corresponding with and receiving material support from friends—the Russian emigrees in France—and her 'punishment' was exile to the city of Chimkent in Soviet Central Asia.[7] The 18th meeting that was held on 28 October 1936, after Romashov's recovery, was notable for the absence of Balkashina, who would never again return to scientific work. Also missing was another of Chetverikov's students: Alexander Promptov who left the Brigade, citing disagreement with the group's approach to studying evolution. Aside from Romashov, Kirpichnikov, and Malinovskii, the 'new' Evolutionary Brigade included Dmitrii Shaskolskii, who was involved chiefly in mathematical genetics, along with V.N. Beliaieva, N.D. Duseieva, and K.A. Panina, who worked under Romashov on the genetics of wild populations of *Drosophila*. Sometime later the Brigade was joined by E.A.Khokhlina, who studied the genetics of common carp together with Kirpichnikov.

A "Brief Report on the Work of the Evolutionary Brigade, 1934—1940", signed by Romashov, contains seven typewritten pages. The report lists the three main tasks that Romashov's group focused on: studying the genetic structure of natural populations in different species of *Drosophila*; genetic research on ecological and geographical 'races' of carp; and mathematical analysis of drift, mutation process, natural and artificial selection, as well as of "the behavior of chromosomes in populations of wild and domestic species". The Mathematics Group that was formed as part of the Evolutionary Brigade, presumably in 1937, included Valerii Glivenko and Nikolai Smirnov; according to the report, Andrei Kolmogorov, director of the Moscow University's Institute of Mathematics, also took part in its work. Romashov's school friend, Kolmogorov had helped Romashov and Dubinin with the mathematical part of their research on drift in the early 1930s, and by the mid-1930s he was known as one of the world's leading experts in probability theory. Unfortunately the Babkoff collection does not contain either the reports of the Mathematics Group or the minutes of its "Mathematics Seminar" that Romashov mentions in an earlier four-page typewritten report about the Brigade's work between October 1938 and June 1939. There is also an unsigned and unfinished report that covers the period from January 1937 to September 1938.

A list of Brigade's publications includes the titles of several unpublished manuscripts whose location remains unknown. Important details about the group's scientific interests are found in the list of invited talks given at its meetings, as well as at the meetings of the "Evolutionary Seminar" that Dmitrii Romashov had organized earlier, working at Dubinin's Genetics Department in 1931-1934. There is a two-page report describing the activities that took place as part of the Seminar, as well as the minutes and the titles of twenty-six talks delivered at the Seminar's meetings. The collection also contains a letter from Alexander Promptov to Dmitrii Romashov, dated 15 October 1936, explaining Promptov's motives for leaving the Evolutionary Brigade, as well as two typescripts about Romashov's participation in the so-called "Lamarck Circle" that met at the Moscow University's Zoology Museum in the early 1920s when Romashov was a student; finally, there is a twenty-two page typescript of an unpublished historical article that was written by Valentin Kirpichnikov and Alexander Malinovskii, apparently in the 1970s, entitled "The Evolutionary Seminar and the Evolutionary Brigade (Laboratory) at the Institute of Experimental Biology (1932–1940).

Highlights of the Archive

Analyzing the documents of the Evolutionary Brigade provides important insights into the nature of Russian geneticists' interest in natural populations of *Drosophila*. Explaining why the study of these populations is important for evolutionary genetics, Dmitrii Romashov referred to their genetic "heterogeneity" that made wild populations different from laboratory colonies of *Drosophila*.[8] Essentially, 'heterogeneity' was 'a sum' of mutations each of whom scientists could pick out of 'nature' and study in laboratory. At the same time, the dichotomy between natural and laboratory populations implied hierarchy—making mutations evolutionary relevant, the processes of genetic expression, drift and selection unfolded in 'real', authentic nature and could not be properly understood in laboratory.

The members of Romashov's group believed that the structure, size, and genetic composition of populations shaped the process of genetic expression—the way in which mutations translate into phenotypic variation. The group obtained important results about the expression of recessive mutations in wild populations, expecting that further research would bring evidence about the higher expression of mutant genes in smaller, semi-isolated populations. Genetic expression also depended on the action of non-allelic genes that were abundantly present in wild populations, 'distorting' the standard ratios of Mendelian segregation. Exploring genetic expression as a populational problem led to further discussions about the evolutionary role of mutations as function of 'local' conditions— of size and structure of populations, rather than of the selective value of mutations per se. The group's belief that phenotypic expression, drift, and selection profoundly depend on the specific characteristics of local populations also shaped its interest in the comparative study of populations, both within and between species. Along with *Drosophila melanogaster* whose mutations had been already well studied by the experimental geneticists, the Evolutionary Brigade also worked with populations of *D. funebris*, *D. phalerata*, *D. transversa*, and *D. vibrissina*. Later the list was extended to include common carp (*Cyprinus carpio*), sable (*Martes zibbelina*), and arctic fox (*Alopex lagopus*).

Discussing the program of its future work at the founding meeting that was held on 28 October 1934, the members of the Brigade paid special attention to the study of "Gelendzhik population of [*Drosophila*] *melanogaster*." With few fruit gardens in and around Moscow[9], geneticists had no easy access to the wild populations of *D. melanogaster*, and were to send special collecting expeditions to Gellendzhik on the Black Sea. The genetic analysis of flies from Gellendzhik, as well as from other locations in the South, provided the evidence about the phenotypic expresssion of many recessive mutations in wild populations of *D. melanogaster*. Examining several other *Drosophila* species that fed on mushrooms and could be easily found in the forests around Moscow, the group also discovered the frequent segregation of recessive mutations in smaller, semi-isolated populations of these species.[10] These results were in clear contradiction with Chetverikov's belief that wild populations combined genetic 'heterogeneity' with 'phenotypic homogeneity' (or 'uniformity'—'*odnorodnost*'), with mutational variability remaining in a 'hidden' state.[11] At the same time, analyzing genetic expression as a problem of population genetics raised a larger theoretical question: To what extent does the evolutionary fate of new mutations depend on the level of their expression in local populations? According to Dmitrii Romashov, the newly arising recessive mutations had no selective value because of their low expression[12]—in this respect, the discovery of expression in natural populations served as evidence that drift can effectively raise the concentrations of mutations, making them subject to selection. The phenotypic expression in larger populations in which drift was weak raised questions about the possible role of migration and population expansion in the spread of mutations.

At their first meeting, the members of the Brigade also discussed the results of Balkashina's and Romashov's earlier research. Working with populations of *D. funebris*, they described a number of morphological aberrations that were caused by combinations of genes, rather than by individual genes and mutations. According to Balkashina and Romashov, experimental geneticists paid little attention to the complex patterns of multiallelic inheritance, as well as to variable, incomplete expression, focusing on 'good' mutations that followed the standard ratios of Mendelian segregation; as a result, the actual genetic nature of much of the phenotypic variation remained invisible to the geneticists of "Morgan's school".[13] At the Brigade's 13th meeting, held on 17 January 1935, Elizaveta Balkashina informed the group that she was planning to present the results of her work about the incomplete expression and polygenic inheritance in *D. melanogaster*, *D. funebris*, and several other *Drosophila* species at one of the Brigade's next meetings. This never happened because of Balkashina's arrest, but after the group resumed its work in October of 1936 Romashov and three younger associates—V.N. Beliaieva, N.D. Duseieva, and K.A. Panina—continued Balkashina's research, studying the populations of *D. melanogaster* in Ufa, Kutaisi, Alma-Ata, Odessa and other locations across the former Soviet Union. Exploring the inheritance of wing venation patterns and other morphological traits, they found that random combinations of widely spread non-allelic genes caused variation of these phenotypic traits in populations of *D. melanogaster*.[14]

According to Vassily Babkoff, Chet-verikov's school developed an innovative approach to the problem of phenotypic variation, combining genetics of development (phenogenetics) with the study of natural populations.[15] However, examining the archival documents of the Evolutionary Brigade, as well as the publications of its members, demonstrates important differences between the two groups of Chetverikov disciples: the Evolutionary Brigade and the 'German group' of former DrozSoor members—Nikolai Timoféeff-Ressovsky, his wife Helena Timoféeff-Ressovsky, and Sergei Tsarapkin who moved to the Kaiser Wilhelm Institute for Brain Research in Berlin-Buch, Germany, in 1925–1926. Exploring phenotypic variation as a genetic problem, Romashov and his group found no significant differences in patterns of variation between populations—the polygenes and modifier genes that were responsible for the development of phenotypic traits were widely spread through all populations of *D. melanogaster* and other *Drosophila* species. Unlike Romashov, Timoféeff believed that genetic expression of mutations depended on the unique, 'harmonic' gene combinations that formed in different geographic 'races' of *Drosophila* and other living organisms. In his view, these unique combinations helped populations and 'races' adapt to the specific environmental conditions.[16] According to Romashov, the frequently occurring gene combinations could play an important evolutionary role, shaping the expression of new mutations, but there were no 'harmonic' or 'disharmonic' combinations with the allegedly superior or inferior selective value.

The emphasis on the evolutionary significance of individual mutations, rather than of gene combinations, is visible in a series of talks that Alexander Malinovskii delivered on 9 November 1934, on 5 March 1935, and on 3 April 1937. In these talks that had a general heading "The optimal structure of a population", he described a situation when a population is divided into many partially isolated subpopulations, arguing that a certain level of genetic exchange is favorable for progressive evolution. Following the ideas that Sewall Wright had developed in his 1931 article "Evolution in Mendelian populations"[17], Malinovskii analyzed the evolutionary impact of isolation and migration on the selection and spread of mutations through populations. Unfortunately we don't know whether the 'Mathematics group' that functioned as part of the Evolutionary Brigade has analyzed Malinovskii's model because the Babkoff collection does not include the minutes or other materials of this group. However, the text of Andrei Kolmogorov's 1935 article[18] contains the evidence that geneticists actually discussed Malinovskii's ideas with the mathematicians: on the suggestion of Dubinin and Romashov, Kolmogorov subjected Malinovskii 'qualitative model' to mathematical analysis. Assuming that a population is subdivided into many subpopulations, Kolmogorov has calculated the "optimum of isolation" (measured as number of migrants), enabling the most rapid selection and spread of a recessive gene through a population. Kolmogorov did not address the question about a sub-population's 'optimal' size, and, in his further work, Malinovskii examined the problem, emphasizing the antithetic relationship between selection and drift—in larger populations mutations had few, if any, chances to spread and become subject to natural selection because of the weak drift; in smaller populations, the useful mutations were swamped by the 'excessive' variation caused by both strong drift and the relatively weak effect of selection.

These theoretical discussions about mathematics and evolution sounded gibberish to Alexander Promptov, Chetverikov's former student and the cofounder of the Brigade, who decided to leave the group in October of 1936 when it was about to resume its work. Citing the "unbridgeable differences" between the group's members in a letter to Romashov, dated 15 October 1936, Promptov complained about the "orthodox geneticists" who, in his view, were "isolated from living nature", while the proponents of mathematical theories of drift and evolution were "up in the clouds". In fact, the group's research on the evolutionary dynamics of populations was far from Promptov's interests that lay in the study of speciation and 'ecological isolation' in birds.[19] It is also likely that 'natural populations' of geneticists did not appear as 'real' systematic groups to many zoologists and naturalists. In this respect, *Drosophila* species were an unsuitable object for studying raciation and speciation because of the absence of 'good' morphological markers of systematic difference below species level. These complications may be a reason why the group changed some of its plans soon after Promptov's departure. At the meeting, held on 27 May 1937, the Brigade decided that Valentin Kirpichnikov's research on the genetics of *Drosophila* should be abandoned in favor of the 'more important' work that Kirpichnikov did on the genetics of common carp.[20] For Kirpichnikov, carp became a model for studying the formation of geographical races whose visible morphological differences could be traced down to a small number of genes. In their preoccupation with morphological markers of systematic difference the members of the Brigade were not alone—at about the same time Theodosius Dobzhansky spent a huge amount of time and labour, developing a sophisticated statistical technique to make possible the differentiation between two 'races' of *D. pseudoobscura* on the basis of external morphology alone.[21]

The minutes of the group's meetings indicate that it invited numerous guest speakers from other laboratories and research institutions to talk about a wide range of topics, from systematics and ecology to zoopsychology and experimental embryology. According to Romashov's 1940 report, studying "the evolutionary problem in all its breadth" required an interdisciplinary, "complex" approach. However, his plans for further interdisciplinary work have never materialized. A critical campaign that Lysenko and other genetics deniers unleashed against Nikolai Kol'tsov in the early months of 1939 led to Kol'tsov's dismissal as Institute's director; the campaign also triggered a series of events that led to the Institute's reorganization and the closure of the Evolutionary Brigade, with its last meeting taking place on 4 April 1940. Dmitrii Romashov left the Institute, working on some of his genetic and evolutionary topics at the All-Union Institute of Pond Fisheries until May 1948 when secret police arrested him for reasons that still remain unknown.[22] When he was released soon after Stalin's death in 1953, Lysenko continued to dominate the Soviet scene, and Romashov was not able to resume his *Drosophila* research until his death in May of 1963. It is remarkable that Alexander Promptov was the only one of ten Chetverikov's former pupils, the members of DrozSoor, who has been neither arrested nor forced to change jobs, commiting suicide soon after the infamous 1948 meeting of the Soviet Agriculture Academy.

Conclusion

Although the ideas of the Evolutionary Brigade remained virtually unknown outside of the former Soviet Union, examining its work can help us develop a broader historical understanding of the relationship between experimental genetics and the study of natural populations in the twentieth century's evolutionary biology. Studying natural populations, geneticists—Sergei Chet-verikov and Dmitrii Romashov in Russia, Nikolai Timoféeff-Ressovsky in Germany, and Theodosius Dobzhansky in the U.S.[23]—were interested in the evolutionary role of mutations that were widely spread through wild populations of *Drosophila*. But it is likely that there was a fundamental epistemological contradiction at the core of their project: while individual flies, the 'carriers' of mutations, easily survived and reproduced in laboratory, 'natural populations' were tied to their habitat. This contradiction was both a challenge and an opportunity—approaching genetic diversity as an important, 'natural' property of wild populations, geneticists conceptualized it in a remarkably different way. Unlike Dobzhansky, Romashov and Timoféeff-Ressovsky emphasized the role of genetic expression in shaping the phenotypic diversity of wild populations and in making mutations subject to natural selection. Following Sewall Wright's 'adaptive landscape model', Dobzhansky and Timoféeff-Ressovsky believed that the unequal selective value of different gene combinations limits the actual genetic diversity in populations; this idea is conspicously absent from the work of Romashov and his colleagues. Essentially, the interest in genetic diversity that made natural populations different from laboratory colonies of *Drosophila* was part of quest—redefining the boundary between laboratory and field, geneticists were willing to reach out to authentic nature, beyond the boundary. At the same time, we believe that exploring the early research on the genetics of free-living populations of *Drosophila* will provide new insights into the nature of genetic diversity as a complex historical problem, and may help us address diversity as a diverse set of concepts, rather than as 'natural' phenomenon that scientists discovered in the wild.

Notes

[1] Vassily Babkoff, *Moskovskaia shkola evolutsionnoi genetiki [The Moscow school of evolutionary genetics]*, Moscow, 1985; Vassily Babkoff and Elena Sakanian, *Nikolai Vladimirovich Timoféeff-Ressovsky, 1900-1981*, Moscow, 2002; Vassily Babkoff, "Mezhdu naukoi i poeziei: "Metabioz" Velimira Khlebnikova [Between science and poetry: 'Metabiosis' of Velimir Khlebnikov]", *Voprosy istorii estestvoznaniia i tekhniki*, 1987, no. 2, p.136-147; V.V.Babkov, *The Dawn of Human Genetics*, Cold Spring Harbor, NY, 2013

[2] See Mark B. Adams, "The Founding of Populations Genetics: Contributions of the Chetverikov School", 1924-1934 *J. Hist. Biol.*, 1968, vol. 1, p. 23-40; Mark B. Adams, "Towards A Synthesis: Population Concepts in Russian Evolutionary Thought, 1925-1935" *J. Hist. Biol.*, 1970, vol. 3, p. 107-129

[3] Mark B. Adams, "Sergei Chetverikov, the Kol'tsov Institute, and the Evolutionary Synthesis", in Ernst Mayr and William B. Provine (eds.), *The Evolutionary Synthesis: Perspectives on the Unification of Biology*, Cambridge: Harvard Univ. Press, 1980, p. 242-280, on p. 262

[4] On Theodosius Dobzhansky's work—see William B. Provine, "Origins of *the Genetics of Natural Populations* Series", R. C. Lewontin, John A. Moore, William B. Provine, and Bruce Wallace (eds.), *Dobzhansky's Genetics of Natural Populations, I – XLIII*, NY, 1981, p. 1-83; R. C. Lewontin, "Introduction: The Scientific Work of Th. Dobzhansky", *Ibid.*, p. 93-115; Mark B. Adams, *The Evolution of Theodosius Dobzhansky: Essays on His Life and Thought in Russia and America*, Princeton, 1994; and Robert E. Kohler, *Lords of the Fly: Drosophila Genetics and the Experimental Life,* Chicago etc., 1994, p. 250-293; on John T. Patterson—see Theophilius Painter, "John Thomas Patterson, 1878-1960", *Biographical Memoirs of the National Academy of Sciences*, 1965, vol. 38, p. 223-262 and R.P.Wagner and J.F.Crow, "The Other Fly Room: J.T.Patterson and Texas Genetics", *Genetics*, 2001, vol. 157, p. 1-5; on Cecil Gordon – see fn.1, Babkoff, *The Moscow school…*, on p. 45

[5] D.D.Romashov, "Ob usloviiakh "ravnovesiia" v populiatsiiakh [On the conditions for "equillibrium" in populations]", *Zhurnal eksperimentalnoi biologii,*, Ser. A, 1931, vol. 7, p. 442-454; N.P.Dubinin "Genetiko-avtomaticheskie protsessy i ikh znachenie dlia mekhanizma organicheskoi evoliutsii [Automatic genetic processes and their significance for the mechanism of organic evolution]" *Ibid,* 1931, vol. 7, p. 463-479; N.P.Dubinin and D.D.Romashov, "Geneticheskoe stroenie vida i ego evoliutsiia. I. Genetiko-avtomaticheskie protsessy i problema ekogenotipov" [The genetic structure of the species and its evolution. I. Automatic genetic processes and the problem of ecogenotypes], *Biologicheskii zhurnal*, 1932, vol. 1, p. 52-95

[6] William B. Provine, *Sewall Wright and Evolutionary Biology*, Chicago etc.: Univ. of Chicago Press, 1986

[7] Z.S.Nikoro *Eto moiia nepovtorimaia zhizn': Vospominaniia genetika [This is my unique life: Memoirs of a geneticist]* Moscow: Academia, 2005, on p. 170

[8] Romashov, "Ob usloviiakh "ravnovesiia"…", 1931, see fn. 5

[9] Babkoff, *The Moscow school…*, on p. 36

[10] Genetic research on Gellendzhik flies was one of the few projects that the Evolutionary Brigade did together with the geneticists of Dubinin's Genetics Department. See N.P.Dubinin, D.D.Romashov, M.A.Geptner, Z.A.Demidova, "Aberrativnyi polimorfizm u Drosophila fasciata Meig. (syn.—melanogaster Meig.) [Aberrant polymorphism in Drosophila fasciata Meig. (syn.—melanogaster Meig.)]" *Biologicheskii zhurnal*, 1937, vol. 6, p. 311-354; E.I.Balkashina and D.D.Romashov "Geneticheskoe stroenie populiatsii Drosophila. I. Geneticheskii analiz Zvenigorodskikh (Moskovskoi oblasti) populiatsii *Drosophila phalerata* Meig., *transversa* Fall. i *vibrissina* Duda [The genetic structure of Drosophila populations. I. Genetical analysis of populations of *Drosophila phalerata* Meig., *transversa* Fall. and *vibrissina* Duda of Zvenigorod (Moscow region)]" *Biologicheskii zhurnal*, 1935, vol. 4, p. 81-106

[11] S.S.Chetverikov, «O nekotorykh momentakh evoliutsionnogo protsessa s tochki zreniia sovremennoi genetiki [On several aspects of the evolutionary process from the viewpoint of modern genetics]», *Zhurnal eksperimentalnoi biologii*, Ser. A, 1926, vol. 2, p. 3-54, on pp. 20-21

[12] Romashov, "Ob usloviiakh "ravnovesiia"…", 1931, see fn. 5

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[16] N.W.Timoféeff-Ressovsky, "Über den Einfluss des genotypischen Milieus und der Aussenbedingungen auf die Realisation des Genotyps" *Nachrichten der Gesellschaft der Wissenschaften zu Göttingen, Math.-Phys. Fachgruppe YI*, 1934, Neue Folge, vol. 1, p. 53-106, on p. 102-103; "The Genogeographical Work with *Epilachna Chrysomelina* (Coleoptera, Coccinellidae)", in *Proceedings of the Sixth International Congress of Genetics*, Ithaca, 1932, vol.2, pp. 230-232

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[22] E.I.Balkashina, V.N.Beliaeva, K.A.Golovinskaia, N.B. Cherfas, "D.D.Romashov i ego rol' v razvitii genetiki [D.D.Romashov and his role in the development of genetics]", *Iz istorii biologii*, 1975, vol. 5, p. 76-91; for Romashov's arrest—see the manuscript of Elizaveta Balkashina's recollections, N.I.Vavilov Memorial Museum, *Balkashina collection*

[23] Unfortunately we know little about the work of other geneticists—Nikolai Dubinin, John T. Patterson, and Cecil Gordon—who did important research on natural populations of Drosophila in the 1930s.

Centrum Mendelianum: The Mendel Museum Moved to the Former Premises of Mendel’s Scientific Society

Anna Matalová *and* Eva Matalová*

THE former Mendelianum of the Moravian Museum in the Augustinian Monastery in Old Brno was originally founded by the Gregor Mendel Genetics Department of the Moravian Museum in 1965 in the form of a J. G. Mendel Memorial. Mendelianum originated in an uneasy time of the post-Stalinist Lysenkoism era in the former Czechoslovakia. The Genetics Department itself started working in 1962 when the Nobel Prize awarded for the discovery of the DNA structure to Watson and Crick helped open genetics behind the iron curtain (Matalová A, Sekerák J., Genetics behind the iron curtain. Brno: Moravian Museum, 2004).

Jaroslav Kříženecký, founder of the Gregor Mendel Genetics Department in the Moravian Museum, was released from a communist prison in 1958. He was put in jail for his incessant criticism of the Soviet genetics that taught the inheritance of acquired characters and was strictly anti-Mendelian. During the era of the political thaw that was stopped by the Soviet invasion to Czechoslovakia in 1968, an open international historical workplace for genetics with a significant support from abroad originated and became known as Mendelianum.

On the occasion of the fifty-year anniversary of its continuous activities, the Mendelianum in cooperation with Mendelian scholars and geneticists made a proposal for an innovated and extended Mendelianum under the heading Centrum Mendelianum (Mendelianum Centre, MCentre). Since 2012, the MCentre has been located in the authentic premises of Mendel´s Agricultural Society housed in the former Bishop's residence in the historical heart of Brno that brought Mendel instigation for his experiments.

Mendelianum Introduces its New Concept

J. G. Mendel was a versatile personality—a physicist, naturalist, teacher in real subjects, researcher and experimenter, promoter of public education, meteorologist and bank manager. However, it was through his scientific achievement that he became world famous as a scientist (Matalová A., Gregor Johann Mendel. Brno: Moravian Museum, 1999).

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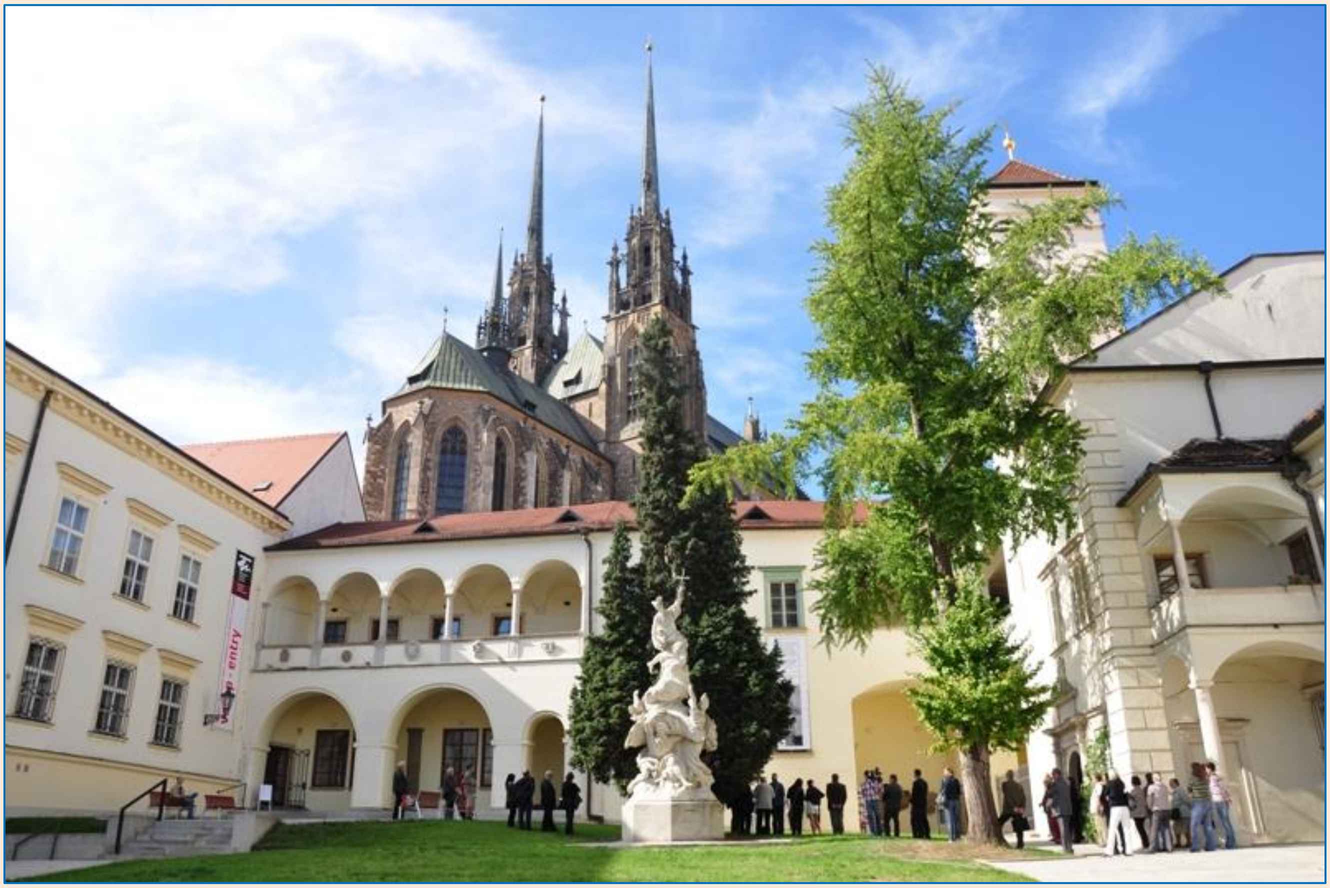

Figure 1. Location of the Mendelianum Centre within the Moravian Museum in the heart of Brno.

The Agricultural Society replaced the Moravian Academy of Sciences and founded the Moravian Museum in 1817. The Agriculture Society gathered experts from forestry, agriculture, horticulture, viniculture and viticulture, pomology, meteorology, sheep breeding, beekeeping and statistics. Mendel actively worked in the Agriculture Society in the place where now the Mendelianum has been housed, from 1851 until his death in 1884. The Moravian Museum is the only scientific institution in the world directly continuing research into natural sciences constituted by Mendel and his colleagues and their predecessors.

To mark 50 years of intense work in research, development and propagation of Mendel´s cultural and scientific heritage, Mendelianum prepared a new concept of Centrum Mendelianum (MCentre).

The aim of the MCentre is to provide a complex modern base built upon solid historical foundations and opened to both professionals and the general public. The MCentre integrates scientific, training, and popularising aspects. As such, the conception of the MCentre is supported by three pillars:

1) Mendel´s Scientific Centre
2) Mendel's Visitor Centre
3) Mendel´s Interactive school

Mendel´s Scientific Centre was established on the 50 years of Mendelianum tradition in science and research related to Mendel and his ideas.

The activities include:

- Files are collected, classified, stored and displayed concerning Gregor Mendel´s biography and the scientific context of his discovery, said documentation being created by researchers from here and abroad into Mendel´s heritage since the beginning of the 20th Century.

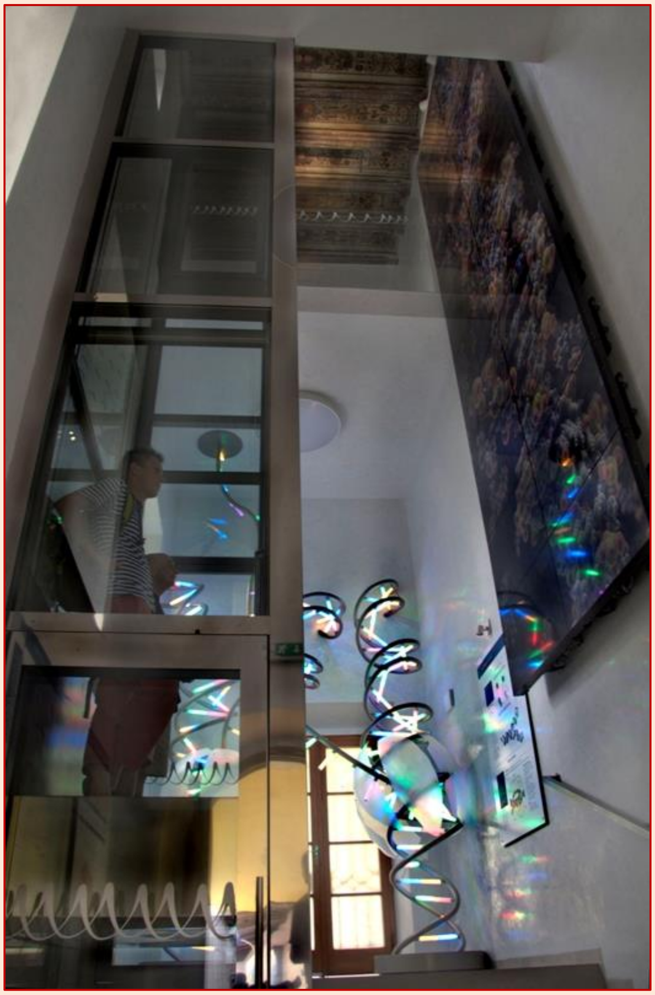

Figure 2. Gene expression presented in 3D models and explanation using 3D annimations along with the movement of the lift.

- *Folia Mendeliana*: the only international specialized historical-scientific reviewed journal with the research results on Mendel's life and reports on the origin and early development of genetics.
- Mendel Forum: conferences organized yearly since 1992 for professionals, later expanded to include a space for meetings of scientists, teachers, students and the general public.
- Mendel Medal: annual unique appreciation of internationally prominent personality for his/her contribution to the development of the scientific and cultural heritage of J. G. Mendel and genetics.
- Mendel Lecture: since 1992, it represents a significant opportunity for scientists to present their research within the framework of the awarding of the Mendel Memorial medal of the Moravian Museum.
- Mendel´s native house: cooperation in the foundation of the historical trust house of Mendel´s parents, its reconstruction, preparation of exhibitions, excursions, together with a long-term cooperation in the evaluation of the students´ competition taking place in Mendel´s Hynčice for talented secondary school students.
- Mendel Brno: since 2001, organization of occasional strolls around Mendel´s Brno with an expert commentary, complemented by short-term exhibitions, publications and other activities.
- Exhibitions and expositions: a long-term tradition of professional and popular science exhibitions. J. G. Mendel Memorial, Mendelianum (Mendlovo náměstí) – 1965—2000, Mendelianum (Údolní Street) – 2001—2006, Mendelianum Centre (Biskupský dvůr) – since 2012.
- Professional publications: in addition to papers published in *Folia Mendeliana* and other international journals, this section includes the issue of professional and popular scientific publications (Gregor Johann Mendel, Genetics Behind the Iron Curtain, Mendel in a Black Box, Experiments on Plant Hybrids, Mendel´s Brno, and many others).
- Other activities: lectures, seminars, excursions, popularization activities, film and interactive materials, Web pages, etc., etc.

Mendel´s Visitor Centre presents a modern form of a living museum, which includes laboratories and other interactive elements that enable an active involvement of visitors in science and research. Mendel is not presented in a golden heavy frame, but as a living original thinker.

The basic parts of the Visitor Centre consist of:

- Introductory section: From the genetic program to its implementation
- Molecular-biological laboratory: The desire to explore and discover
- Genetic stories on the background of Nobel Prizes: Mendel in the concept of today's science
- Historic hall and modern science: A counterpoint of old and new
- Conference Hall: the place where Mendel was meeting his hybridizing colleagues and gathered motivation for his experiments
- Mendel's laboratory: disclosure what Mendel knew and what he couldn't know
- Scientific environment of Mendel´s discovery: A trip to Mendel´s epoch
- Mendel´s experimental plants: Mendel's verification of his discoveries
- Mendel Brno: Walking in the footsteps of J. G. Mendel

Mendel´s Interactive School takes advantage of the incentive aspect of JGM and his heritage to meet the overall concept for popularization and dissemination of results of science and research. A scientist should have not only a thorough knowledge of his field, but also an aptitude to explain it at different levels, as well as a constant interest in self-education.

Mendel was an exceptional, modest and loving personality, but he never established a scientific school of his own during his lifetime. Until 30 years after his death his ideas were incorporated into the body of science giving birth to genetics.

Mendel´s Interactive School has several divisions:

- Mendel Mobile School (MMS): The MMS offers a path of scientific thinking to students. The MMS is a unique project of five mobile laboratories that will allow the input of science and research in secondary schools, in which the interest in science and research is usually created.
- Mendel Scientific Research School (MSRS): The MSRS invites students to engage directly in scientific activities. This part of the school is based on the hands-on experience of students directly in sites of science and research.
- Mendel Popularization School (MPS): A part of the school is the annual organization of popular-scientific conferences Mendel Forum. In the year 2014/2015, this activity is enhanced by internship programmes and workshops.
- Mendel Summer School (MSS): The MSS is a novelty that allows an entertaining education even during a holiday season with the use of facilities of the reconstructed Mendel Native House and the Visitor Centre Mendelianum – an attractive world of genetics.
- Mendel School World Wide + Web (MSW): The MSW offers distant form of education through e-learning and propagation via the website.

Key partners of the Moravian Museum in Brno:

- Institute of Animal Physiology and Genetics of the Czech Academy, v.v.i. (for research institutions)
- Mendel University (for universities)
- Gymnasium of Captain Jaroš, Brno (for secondary schools)

Associated institutions in Brno:

- University of Veterinary and Pharmaceutical Sciences in Brno
- Faculty of Natural Sciences of the Masaryk University

- Faculty of Medicine of the Masaryk University
- Masaryk Memorial Cancer Institute
- Institute of Vertebrate Biology of the Czech Academy, v.v.i.
- Veterinary Research Institute, v.v.i.
- Brno University of Technology

International Advisory Board:

- Prof. Jan Klein, Pensylvania State University, USA (chair)
- Prof. Robert C. Karn, University of Arizona, USA
- Dr. Hervé Lesot, University of Strasbourg, France
- Dr. Dinko Mintchev, Academy of Sciences, Bulgaria
- Prof. Paul T. Sharpe, King´s College London, UK
- Prof. Valery N. Soyfer, George Mason University, USA

Financial support:

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- The project of the visitor centre – Mendelianum – Attractive World of Genetics (CZ. 1.05/3.2.00/09.0180) is financed by the European Fund for Regional Development. The project of the Mendel Interactive School of Genetics (CZ.1.07/2.3.00/45.0037) is financed from the European Fund for Social Development and the State budget of the Czech Republic.

The centre was established in 2012, the comprehensive complex will be inaugurated on March 8, 2015, on the occasion of the anniversary of 150 years since the publication of Mendel's discovery paper in Brno, and of 50 years since opening the “old” Mendelianum.

Mendel Comes Back to His Home Scientific Community in the Moravian Museum

In the world-famous work "Experiments on Plant Hybrids," which became the basis of genetics, Mendel presented for the first time on the platform of the Natural Science Society. This was part of the former Moravian Academy known under the name Agricultural Society (AS). The AS resided in the Bishop's Court in Brno where is now located the Mendelianum Centre.

The Bishop's Court was acquired by the Moravian-Silesian Society for the Improvement of Agriculture, Natural Science and Knowledge of the Country in 1817 and created there a pioneer centre of an organized research in Moravia and Silesia. In addition to the depositories and exposures of the Francis Land Museum, the AS created therein its operating headquarters. Through the modern term of the natural history in its name, the AS declared its loyalty to the new natural science trend that started to penetrate into the science of agriculture. The Agricultural Society developed not only natural sciences (physics with meteorology, biology with geology and mineralogy, mathematics, statistics, biology, chemistry) but also social sciences and liberal arts. It was the AS, which laid the foundations of the Moravian Gallery in Brno and the Moravian Science Library. In lexicons, the AS was reported among scientific academies as the Academy for Moravia and ranked among the progressive institutions of the experimental and art-loving orientation. Its members have introduced real and technical education in Brno, its graduates have successfully contributed to the industrialization of the country.

Figure 3. Mendel welcomes his students and visitors in the authentic Meeting Hall of his scientific Society (Agriculture Society).

After the revolution year 1848, the AS changed its statutes and opened itself to a wider professional and interest public in recruiting new members. On the pattern of the AS, rural intelligence established local associations in smaller towns and villages, organized exhibitions of flowers, vegetables and fruits, listed prices for the acquisition of new varieties. Through awarding medals and recognitions, the AS supported the efforts and strengthened the economic awareness of the broad masses of the population in Moravia. After 1848, a part of the members separated from the Moravian-Silesian Agricultural Society and created a Silesian Agricultural Society. The Moravian Agricultural Society continued to develop its professional structure that included a fruit growing-viniculture and horticultural department, a forestry section, a beekeeping association, an agro-agricultural division, a historic-statistical department and a natural science department, which included mineralogy, geology, botany, zoology and meteorology. Mendel joined the natural science section in July, 1851. The official nomination was issued in January, 1855.

Mendel joined the activities of the Agricultural Society immediately after his return from the Vienna University in the fifties of the 19th century. He contributed to many specialized sections of the Society, his experiments with pea hybrids Mendel carried out within the natural science section of the AS (naturwissenschaftliche Sektion); this includes also his work on agricultural pests Bruchus pisi and Botys margaritalis. Here began Mendel his meteorological observations. In 1861, the natural science section started its transformation in a natural science association (*Naturforschender Verein*), in which Mendel continued in the research of hybrid plants and meteorological observations. Here, Mendel spoke on its discovery in 1865. A year later his work on pea was published in the Association magazine Verhandlungen des naturforschenden Vereines in Brünn. In 1869, he published in this Association his paper on some hybrids of Hieracium.

In 1868, he became Abbot, and it was only a matter of time when he would replace his deceased predecessor Abbot Napp in the leadership of the AS. The AS General Assembly voted the members of the Main Committee for the term of three years. Mendel became a member of the Central Committee of the AS in January 1870. As a member of the Main Committee of the AS attended Mendel regularly the Moravian Museum and actively participated in solving problems in all sections and associations of the AS and signed also reports on the economy of the Museum. His publication and professional activity reaches a broad professional spectrum that traces the professional construction of the AS. The most important are his works in meteorology, entomology on pests of agricultural crops and then innovative plant physiology. On the thematic structure of the AS is based also Mendel´s activity in the field of apiculture, fruit growing, horticulture and viticulture. Mendel devoted a considerable attention to the publication of papers on the latest professional literature, reviews of the latest news and co-determined the acquisition policy of the library of the Provincial Museum. He interfered in listing competition issues and their evaluation and remuneration. He was also active as a member of the evaluation committee for exhibitions of flowers, fruits and vegetables, in which he had taken part with his cultivars. In the field of pomology, the AS named him an official examiner for the qualifying examination of fruit-growers. For his wide horizon of knowledge, he was involved in the distribution of agricultural subsidies of the AS and promoted the implementation of new knowledge into practice. The professional work in the AS, to which he devoted the rest of his life, was for Mendel an escape from his abbatial duties. None of his numerous resignation letters was intended to the Agricultural Society. The world of the Agricultural Society Mendel transferred to his prelature. The fruit growing, viticulture and horticulture appear in ceiling paintings in the library of the Augustinian monastery in Old Brno, which capture the composition of ornamental plants, fruit and grapes. The paintings were made on request of Mendel in 1875. We must gratefully acknowledge that Mendel´s scientific work in the Agricultural Society and its Natural Science Association brought him great satisfaction and balanced the injustice (Kränkungen) which brought him his "fight" against increasing the monastic contributions to the religious fund.

It is commonly stated in the literature that before a so called rediscovery of Mendel in 1900, no one realized the significance of his work. In connection with the Museum and the Agricultural Society we can demonstrate that members of its horticultural-fruit growing-vinicultural section considered Mendel's experiments with plant hybrids for epochal even during his life and stressed their importance in the necrology, which was published shortly after his death. It is apparent from a historical documentation that in the AS in the Bishop´s Court Mendel was among his own people.

We believe that Mendel's passion for scientific work will have a positively impact on "his students" in authentic premises where the ideological environment of Mendel's discovery was formed. The location of Mendel´s study and visitor centre in the historical centre of Brno, near the train and bus station, will allow an easy access even to foreign visitors who will be simultaneously able to employ the Mendel´s documentation centre which since 1966 publishes the specialized English-language journal *Folia Mendeliana*. In managing the professional part of the project takes part the international council of scientists with the participation of our experts. The inauguration of the project is devoted to the 150th anniversary of the publication of Mendel's scientific work through lectures and the 50th anniversary of the foundations of the Mendelianum.

Mendelianum Presents Mendel´s Scientific Board in Brno

In 2012/2013, the Mendelianum of the Moravian Museum focused its activity on presenting Mendel in the open space of the historic city centre of Brno (Matalová A., Mendelovo Brno. Brno: Moravian Museum, 2012). The Tourist Information Centre has resumed the program "Walks through Mendel´s Brno", which was organized by the Mendelianum since 1992. The Tourist Information Centre wants to continue with this successful project of guided tours, so that candidates and students can look forward to get acquainted with Mendel in a live form and to discuss directly with experts of the Mendelianum.

Following the presentation of sites associated with the work of Johann Gregor Mendel, the Mendelianum in 2013/2014 presents the personalities with which Mendel was in direct professional contact, and which could have an impact on him in terms of a scientific research. An important member of Mendel´s Council is Professor Franz Diebl from which Mendel obtained a certificate in the field of agriculture, fruit growing and viticulture. The certificate from these fields was an important qualification for Mendel both for his teaching career and his professional activity in the Agricultural Society. The Agricultural Society founded in 1817 the Francis Museum, now the Moravian Museum. Another person from Mendel´s circle is Alexander Zawadzki, who engaged Mendel in the natural science section of the Agricultural Society. Zawadzki was an eminent physicist, botanist and Mendel's colleague from the grammar school.

In an environment of the Agricultural Society, Mendel had information about the research of hybrid plants from Jan Tvrdý, Hans Molisch and Gustav Niessl who monitored this issue, procured live specimens of hybrids for the lecture meetings and published the results of their research in the specialized literature. The study of variation and selection in the spirit of Darwin belonged to the research field of Mendel´s friend Matouš Klácel, who bequeathed his monastery experimental garden to Mendel. Mendel´s monastic brother Tomáš Bratránek explicated in his reflections on the plant aesthetics the ideas about the development of nature as a living organism in the dynamic conception of German natural philosophy. From Pavel Olexík, Mendel obtained meteorological observations and some meteorological instruments. Alexander Makowsky, professor of natural science at the Technical Institute in Brno, reported in the press about Mendel lecture in 1865 and thanks to him we now know as Mendel notice of his discovery was accepted. In the Agricultural Society, Mendel cooperated with an apiarist František Živanský who correctly anticipated that Mendel could not be successful in his hybridization experiments with bees. A. Tomášek reported on Mendel´s acclimatization experiments with a bee Trigona lineata in German and Russian scientific journals. Our Brno circle of Mendel's colleagues in the scientific environment concludes A. Tomaschek known thanks to his work about Mendel´s acclimatization experiments with the bee, Trigona lineata Lep. Published in the journal Zoologischer Anzeiger in 1870. A Thomaschek was a professor of natural sciences, who also investigated plant fertilization. As Mendel, A. Tomaschek studied botany at professor Unger at the Vienna University. Individual personalities and their relationship to Mendel give an insight into the ideological context of Mendel's scientific work, the focus of which was in the scholarly Agricultural Society that is in Otto's educational vocabulary marked as the Moravian Academy of Sciences, which supported science, research and education.

The research activity of the Mendelianum to the topic of Mendel's Scientific board will be crowned with an exhibition, which will be opened in March 2015 on the occasion of the 150th anniversary of the publication of Mendel's world-famous discovery.

Mendelianum Greatly Acknowledges Dedication in the New Book on Mendel to the Mendelianum Tradition by J. Klein

Jan KLEIN, Norman KLEIN: Solitude of a Humble Genius. – Gregor Johann Mendel: Volume 1. Formative Years. Edited by Paul Klein. Springer, 407 s., ISBN 078-3-642-35253-9.

The two-volume biography by Professor Jan Klein, of which the first volume has been published, surpasses all books on Mendel published thus far. It begins with Ancient Greece and explains where modern genetics meets Aristotle and how Mendel fits into it. With a feeling of appurtenance he introduces Moravia and Silesia as part of his effort to capture in detail Mendel's birthplace, his ancestors, parents, sisters, and their life at a farmstead, as well as the four seasons in Kravařsko (Cow Country) of their time.

Starting from Hynčice (Heinzendorf), he accompanies Mendel on his studies to Lipník (Leipnik), to the Gymnasium in Opava (Troppau), and to the Philosophical Institute at Olomouc (Olmütz). In another collection of detailed information and interesting interconnections he deals with Brno and the Augustinian order of Saint Thomas at Staré Brno (Old Brno), where Mendel collapsed physically and mentally at the very beginning of his pastoral activities. The breadth of coverage and the clarity with which one is drawn into the story will surprise many a student of Mendel. The author's systematic organization of the data facilitates a quick search for specific facts of Mendel's life. Incidentally, the book presents many valuable findings, which, however, the author modestly lets to float with the powerful stream of data. It can be expected that in Brno the book will dampen the rapid fermented and would be innovative interpretations of Mendel's life, which have been emerging in the last ten years. We must realize that in Brno Jews, Germans, and Czechs have been developing Mendel's legacy systematically over long period of time at very high level.

In present-day Europe we should interpret Mendel in the dynamic scientific and cultural context. Data remain the same; what is new is the context in which they emerge.

As an Expert on peasant life Professor Klein understands the depth of Mendel's longing for freedom, which led him to join the revolutionaries in 1848. Mendel's personal involvement—as a teacher of physics and natural sciences,—in making education the means toward self-determination in one's personal life, at the same time, sheds light on the conditions existing in the educational system of the monarchy. We learn who governed, who obeyed, and who rebelled; who created and where he found inspiration; who succumbed to utopian visions and who rejected any such visions; who was the last but became the first; who was at the right time at the right place, even though he did know what to expect. From the world perspective we all will welcome the opportunity to visit Mendel's native country, where lived its inhabitants and what they did for living; who were Mendel's neighbours what did they believed in and how they viewed the world. J. Klein even filled in the white spots in regard to Mendel's entry in the monastery, an event which until now most biographers remained silent; about the impact of the revolutionary year 1848 on the life in the monastery; and about the changes that the revolution induced and which affected Mendel positively.

The first volume ends with Mendel's studies at the University of Vienna and the acquisition of the position of a substitute teacher at a higher state secondary school with which ambitions of Freemasons are associated. Each of the six thought circles (Greek view of heredity, sex and type; Mendel´s sorely tried homeland—Silesia and Moravia; the childhood on a farmstead; Mendel´s apprenticeship, the pledge of allegiance, a futile effort to obtain the professorships) is furnished with rich notes, literary references and explanations. Drawings of Norman Klein that bring portraits of people, buildings and places associated with Mendel's life, constitute a great contribution to the book.

Professor Jan Klein is currently the chairman of an international team of experts involved in the construction of the Mendelianum Centre in the Moravian Museum in Brno, which had to vacate its Mendelianum in Old Brno monastery in 2000 after the restitution of the church property.

Professor Jan Klein was born in a small Silesian village near Mendel´s Hynčice. Like Mendel, Professor Klein grew up on a farmstead and attended the grammar school in Opava. In the time of Stalinist Lysenkoism, he defended Mendel´s work and campaigned for the support of the Mendelianum.

Mendelianum Participation in a Weekend with J. G. Mendel in Brno

The anniversary of 150 years since the publication of Mendel´s discovery work Experiments on Plant Hybrids on the territory of the city of Brno, 8. 2. and 8. 3.1865, deserved more than a commemoration. Centrum Mendelianum prepared a unique series of activities under the banner of Mendel´s year of entertaining education.

Jubilee Mendel Forum Conference

March 6 – 8, 2015

Centrum Mendelianum, Muzejní 1, Brno – centre
Czech Republic

www.mendel-brno.cz

Secretary
Ma. Eva Janeckova
MF2015@email.cz

Registration
Free of charge
Limited number of participants
Deadline for abstract submission: Dec 31, 2014
www.mendel-brno.cz

Major Topics

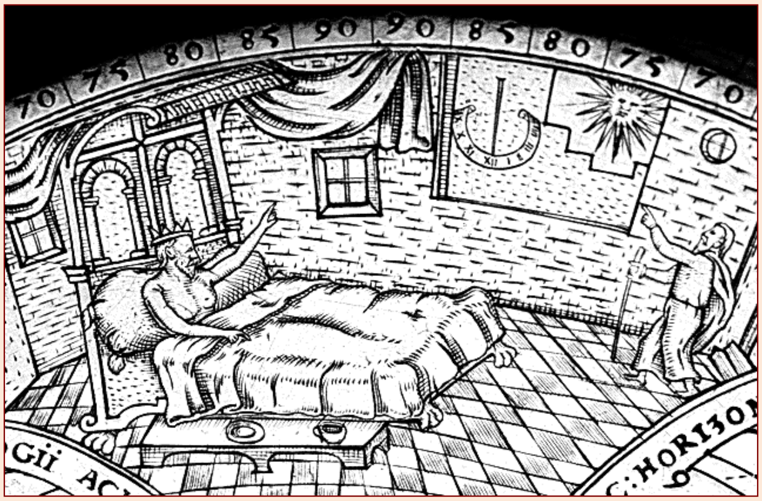
J. G. Mendel (Mendel as a Scientist and Multifaceted Personality, Mendel´s Discovery in Context of Recent Science), Mendel´s Scientific Society (Mendel, Agriculture Society and Moravian Museum, Mendel´s Scientific Collegium in Brno), Mendel´s Plants, Solitude of a Humble genius, Mendel´s Plants, and other related topics announced in submitted abstracts.

Highlights

Ceremonial Inauguration of the Centrum Mendelianum
Walk through Mendel´s Brno

2016–2017

Resident Research Fellowships in Genetics, History of Medicine and Related Disciplines



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Our collection strengths include, but are not limited to

- Studies in Genetics and Eugenics
- History of Physiology, Biochemistry and Biophysics
- American and European Science and Technology
- Natural History Through the 19th Century

History of Genetics Collections

The American Philosophical Society began specifically collecting manuscripts and books relating to the history of genetics in the early 1960s at the instigation of the mouse geneticist L. C. Dunn, but it was the project conducted by H. Bentley Glass between 1977 and 1985 that led to truly outstanding growth. Funded by the Mellon Foundation, Glass surveyed and indexed the existing collections at the library and prepared a printed guide to them for researchers. This was the original basis for the comprehensive guide to the American Philosophical Society's own collections in genetics, which include the papers of L. C. Dunn and H. Bentley Glass, among numerous others.

See the web version of Glass's guide to the APS holdings at

www.amphilsoc.org/library/guides/glass

This online guide contains links to the collection descriptions prepared by Glass, to abstracts of some collections acquired since, and, when available, the complete finding aids. Researchers must also examine our comprehensive, up-to-date online finding aids for all collections through our main page at www.amphilsoc.org/library (and there see the drop-downs under "Library").

The APS continues to seek out new collections in the history of genetics and to make them available to scholars.

Who May Apply

Candidates are

- U.S. citizens or foreign nationals
- Holders of the Ph.D. or equivalent
- Ph.D. candidates having passed their preliminary examinations
- Degreed independent scholars

A stipend of $3,000 per month is awarded for 1 to 3 months. Awardees may take their fellowships at any time between 1 June 2016 and 31 May 2017. Fellows must maintain a presence in the Library for consecutive weeks during the term of the fellowship.

Applications are evaluated based on the quality of the project, the letters of recommendation, and the *relevance of the Library's collections to the project*. Candidates living more than 75 miles from Philadelphia receive some preference.

APPLICATIONS ARE ACCEPTED ONLY ONLINE

Information and Instructions
www.amphilsoc.org/grants/resident

Next application deadline : 1 March 2016

Notifications are sent in early May

Specific inquiries relating to the Library fellowship program may be sent to Libfellows@amphilsoc.org

Inquiries relating to the APS's manuscripts, printed-materials, and other collections may be sent to manuscripts@amphilsoc.org