

Oberwolfach, Yesterday and Today

Allyn Jackson

Of all the world's mathematics institutes, the Mathematisches Forschungsinstitut Oberwolfach is certainly one of the most beloved. Traditionally referred to simply as Oberwolfach, after the tiny hamlet of Oberwolfach-Walke in which it resides, the institute is perched on a hillside in a lovely valley of Germany's Black Forest. This international center has in its more than fifty years of existence served as the site for some 3,000 meetings, drawing mathematicians from all over the world. Founded in the final months of World War II, the institute was originally intended to bolster the Nazi war effort. Instead, it became a meeting place where German mathematicians could heal the severance of international contacts that occurred during the war. In recent years new historical details have come to light that add depth and poignancy to the story of this remarkable institute.

An Institute Is Founded

In 1942, in the midst of World War II, Germany began investing in scientific research as a way to try to ensure a victory, which by then had begun to seem increasingly unlikely. As a result, several *Reichsinstitute* (National Institutes) were founded with the purpose of carrying out scientific and technological research to assist the war effort. Mathematician Wilhelm Süss, rector of Universität Freiburg and president of the Deutsche Mathematiker Vereinigung (DMV, German Mathematical Society), capitalized on this situation to create an institute for mathematical research. Avoiding the

possibility of air raids was a prime criterion in deciding the location, and so a former Black Forest hunting lodge, known as the Lorenzenhof, became home for the Reichsinstitut für Mathematik in September 1944.

Who was Wilhelm Süss? Compared to his German contemporaries of the 1930s, which included Richard Courant, Helmut Hasse, Carl Ludwig Siegel, John von Neumann, Hermann Weyl, and others, Süss was not an outstanding mathematician. But through his administrative, organizational, and political skills, Süss had an important influence on mathematics in Germany. Some held exalted opinions of Süss; for example, Alexander Ostrowski wrote in a glowing obituary upon Süss's death in 1958 [2], "Certainly no one since Felix Klein has done so much for German mathematics as Wilhelm Süss." A history of the founding of the institute, written by Süss's wife, Irmgard Süss [3], paints a picture of a man who braved treacherous Nazi politics to create a haven where mathematicians could be protected from the war and continue their research. Volker Remmert, a historian of mathematics at Universität Mainz, noted that a kind of "sainthood" has enveloped memories of Süss. However, the truth about Süss's career is more complex than the idealistic portraits of him would suggest.

Shortly after Matthias Kreck became director of the Oberwolfach institute in 1994, he received a letter from an historian requesting access to the institute archives. Unaware of their existence, Kreck eventually located the archives tucked away in a cellar in one of the institute buildings. There he found not only documents pertaining to the founding of

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the institute, but also personal papers of Süss and records of the DMV dating from World War II. The material has since been transferred to archives of Universität Freiburg. Remmert is the person most familiar with the archive, and he has written a number of papers based on their content, including one, published just this year, that describes some of Süss's actions during the war [4].

Süss was a geometer who wrote his doctoral thesis in 1920 at Universität Frankfurt, under the direction of Ludwig Bieberbach. The two remained close colleagues after Bieberbach embraced Nazi ideology in the early 1930s. Bieberbach and the mathematician Theodor Vahlen together founded the journal *Deutsche Mathematik*, which published, in addition to bona fide mathematics papers, Nazi propaganda dressed up as research. Bieberbach and Vahlen were at the extreme end of the spectrum in their explicit, outspoken promulgation of Nazi views.

Where Süss is to be found in this spectrum is less clear. Remmert's research shows that, as DMV president, Süss took the initiative in expelling Jews from the membership. Did he do this out of anti-Semitism? Or did he hope to prevent Bieberbach's own, more extreme, union of mathematics teachers from gaining ascendancy? Or did he simply want to consolidate his political power? The answer remains unclear. Remmert's investigations have uncovered various actions on the part of Süss that seem to align him with Nazi views but for which his motivations are unclear. The complete truth will probably never be known, especially because certain documents are missing from the archive. "It is clear the files have been cleaned," Remmert noted.

With the end of the war just six months away, the Reichsinstitut für Mathematik was established in the Lorenzenhof. Because of the importance the government attached to the institute, Süss was able to bring his family there, as well as mathematicians recalled from military institutions, some of Süss's colleagues from Freiburg, and even one French mathematician who had been kept as a prisoner of war. In this way about twenty people survived the end of the war safe in a mathematics institute. Irmgard Süss's history tells a tale of courage and camaraderie in those final days: the problem of securing food and heating; the preparations for flight in case the Lorenzenhof was attacked; the eventual occupation of the lodge; and, once the war was officially over,



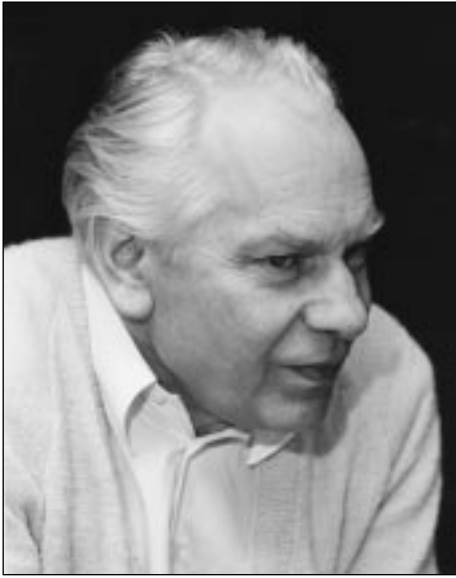
The Lorenzenhof, the original home of the institute, right. Top, the guest house constructed in 1967.



the frantic burning of books on National Socialism that had been stored in the house.

Among the mathematicians living there were the complex analyst Heinrich Behnke and the topologists H. Seifert and W. Threlfall. The founding document for the institute, signed by one of the highest Nazi officials, Hermann Göring, shows clearly that the government wanted the institute to focus on research directly related to the war effort. In any case, it appears that the mathematicians who worked there in the first few months, while mathematical work was still possible, did not feel constrained to concentrate on topics having military applications.

After the war, during the "denazification" period, Süss was suspended from Universität Freiburg for two months during the summer of 1945, but afterward resumed his position and remained director of the institute. One reason he was not treated more severely was that few knew about his actions during the war, as he was careful to carry them out quietly and only with the help of trusted colleagues. In addition, gratefulness for the good things he did likely played a role. The institute lost its funding from the national government but was able to keep going with a small amount from the state government of Baden. Süss worked hard to make the institute truly international. Indeed, Oberwolfach played an important role in the rebuilding of mathematics in Germany after the war by serving as a place for meetings between German mathematicians and their colleagues abroad. On



Martin Barner, Oberwolfach director from 1963 to 1994.

the initiative of Behnke and his longtime colleague Henri Cartan in Paris, French and German mathematicians reestablished contact in meetings at Oberwolfach in the early years after the war. Another important figure from that era was the algebraist Reinhold Baer, a Jew who had been expelled from his job at Universität Halle in 1933. He was a professor at the University of Illinois at Urbana-Champaign and then moved back to Germany to take a position at Universität Frankfurt in 1956. Starting in the early 1950s, Baer organized many meetings at Oberwolfach. Sustaining the institute after the war “was really a brilliant thing,” Remmert remarked. Under the circumstances of the times, “I doubt that any other mathematician in Germany could have done it.” Although Süss did many ethically questionable things during the war, what he did after the war was good for mathematics.

Süss died rather suddenly of liver cancer in 1958 at the age of sixty-three. His close colleague Hellmuth Kneser served as director of the institute for a short period and was succeeded by Theodor Schneider in 1959. That year the Gesellschaft für Mathematische Forschung (Society for Mathematical Research) was founded to provide a permanent legal basis for the Oberwolfach institute, and the society continues in this capacity today. But it was Martin Barner of Universität Freiburg, director from 1963 to 1994, who put the entire enterprise on a secure foundation. Barner “really built up this professional place which we see now,” Kreck noted. “He had all the ideas, the vision, of a really big center.” During Barner’s tenure, the institute obtained funding from the Volkswagen-Stiftung (Volkswagen Foundation) for the construction of a new building to house visitors. Finished in 1967, the building enabled the institute to greatly expand its activities. At that time, the beloved Lorenzenhof still stood on the institute grounds. Unfortunately, in addition to deteriorating badly, the old lodge provided insufficient space for the library and for lectures. It was demolished in the early 1970s and was replaced, again with support of the Volkswagen-Stiftung, by a new building, which now contains the library, lecture rooms, and staff offices. Barner, who is now retired, lives in the Black Forest about an hour’s drive from the institute.

Mathematical Traditions at Oberwolfach

Right after the war there was no formal program of meetings at Oberwolfach. Accommodations were rather rustic: visitors had to bring their own food and collect firewood. As is clear from the institute’s photo albums, the atmosphere in the Lorenzenhof was informal, even familial: one photo shows an exuberant Samuel Eilenberg dancing a jig (the photo is unfortunately too blurred to be reproduced). The first organized meetings took place in 1949. One of them, held in August that year, brought together young French and German mathematicians, including two Fields Medalists in the making, René Thom and Jean-Pierre Serre. A highlight was a lecture by Jean Dieudonné about the work of the Bourbaki group, which was very active in France at the time. Some of the early visitors ended up having long associations with the institute. While still in high school around the end of 1944, Kurt Leichtweiss, who was said to be a mathematical prodigy, went to the institute with his father for an examination by the mathematicians there. The youngster followed their encouragement to study mathematics, and in 1949 he spent several weeks at the institute writing his dissertation. From 1966 until 1982 Leichtweiss was a co-organizer of the annual geometry meeting at Oberwolfach. Now retired, he was a professor at Universität Stuttgart, which is one of the universities closest to Oberwolfach.

From 1949 to 1953 three to five meetings were held every year; the number increased to about a dozen per year after Süss secured funding from the federal government. An infusion of funds from the Fritz-Thyssen Foundation in the early 1960s increased the number of meetings to around twenty per year. But it was really the construction of the guesthouse in 1967 that brought the institute into full bloom. The year before the building was finished, eight hundred people attended meetings at Oberwolfach; the next year, the number more than doubled. From that point forward, Oberwolfach became the world’s mathematical meeting place par excellence. Today it maintains the pattern that evolved in the 1960s of holding one conference per week almost every week of the year. It has also retained its international profile: nowadays one-third of visitors are from Germany, one-third from the rest of Europe, and one-third from the rest of the world. About a quarter of all visitors come from the United States.

In the world of mathematics institutes the one most similar to Oberwolfach is the Centre International de Rencontres Mathématiques in Luminy, France; in fact, that center was founded in 1965 as the “Oberwolfach français”. These two institutes differ from, for example, the Institut des Hautes Études Scientifiques or the Max-Planck-Institut für Mathematik, where the scientific traditions are shaped strongly by the permanent



Top, left: Oberwolfach, summer 1949, left to right: René Thom, Jean Arbault, Jean-Pierre Serre, unidentified, Jean Braconnier, and Georges Reeb. Top, center: Hellmuth Kneser working outdoors, summer 1952. Top right: Institute founder Wilhelm Süß (left) and Georges Reeb, August 1953. Far right: Jean Dieudonné (left) and Jacques Tits, April 1955.



Directly above and right: scenes from the old Lorenzenhof.



Photos directly above, left to right: Alexander Ostrowski, June 1964; Ferdinand Veldkamp lecturing al fresco, 1962; Paul Erdős at Oberwolfach, 1964; Tonny Springer lecturing outdoors, 1962; and Samuel Eilenberg (left) and Henri Cartan, summer 1964.

faculties' research interests. Oberwolfach, by contrast, has no permanent scientific faculty (apart from the director), and a new batch of mathematicians comes through every week. The topics of the meetings range all over the mathematical map, including the field's borders with other sciences, such as physics, biology, medicine, and astronomy.

Despite this diversity, certain traditions have built up at Oberwolfach over the years. Number theory, for example, has been the topic of meetings held every year or two since the mid-1950s. Helmut Hasse, Peter Roquette, and Theodor Schneider were among the early organizers; today biannual number theory meetings are organized by Christopher Deninger and Peter Schneider of Universität Münster and Anthony Scholl of University of Durham. Gerhard Frey of Universität Essen, who has attended about fifty meetings at Oberwolfach since his first one in 1967, was an organizer of the number theory meetings for several years. At these meetings, as well as at the meetings in arithmetic geometry, he learned about many of the most important developments in the field. For example, at an Oberwolfach meeting in August 1983 Gerd Faltings presented his proof of the Mordell Conjecture, which had been completed only a few months before. Barry Mazur's work in the late 1970s on the strong restrictions on torsion groups of elliptic curves, which was the subject of a one-week meeting at Oberwolfach, "was a great stimulus to me," Frey recalled. This work contributed to the discovery of the so-called Frey curve, which is the linchpin of Kenneth Ribet's work linking Fermat's Last Theorem to the Taniyama-Shimura-Weil Conjecture. Although legend has it that Frey first presented his eponymous curve at Oberwolfach, he said the legend is not quite true. Although he discussed it in an informal evening talk at Oberwolfach in 1984, it was a lecture he gave at Oberwolfach in February 1985 that led to Ribet's learning about the curve.

In addition to the series of meetings on number theory, there have also been long-standing series in other broad areas, such as topology, dynamical systems, geometry, logic, function theory, and stochasticity. Such series of meetings serve an important function by providing a consistent forum in which new results are presented. On the other hand, the meetings can grow stale and unexciting, especially if they are always organized by the same people. "When I started here there was a mixture, with rather many series of meetings," Kreck recalled. He has since worked to shift the balance. "Of course, if the world leaders organize meetings here for twenty years, we are happy. But typically we always want to have fresh blood on the organizing team." The only meetings still held every year are the one in stochasticity, and the one in Kreck's own area of topology. He explained that the organizing committees of these meetings, by changing their membership regularly, have come up with

meetings proposals that compete well against other proposals. Some of the other long-standing meetings, such as that in number theory, are still held but not every year, and they too must regularly bring in new organizers.

While the main business of Oberwolfach is the regular week-long meetings, around forty-five of which are held each year, there are also other activities. One, called the *Arbeitsgemeinschaft* (the literal translation is "working team"), is held twice a year and has roots going back to the late 1950s. The purpose of the *Arbeitsgemeinschaft* is to bring together people who wish to learn about a particular topic and who are not experts in it. Once the topic is chosen, the leaders of the *Arbeitsgemeinschaft* choose one or two experts on the topic who map out a plan for a week of lectures to introduce the main ideas. But it is not the experts who deliver the lectures; it is the participants. To take part in the meeting, one must volunteer to speak, and participants typically learn a good deal about an aspect of the topic in order to prepare their lectures. During the meeting they exchange ideas with other participants, who may come from diverse areas of mathematics, and they also have contact with the experts. The *Arbeitsgemeinschaft* was originally led by Peter Roquette and Martin Kneser and later on by Wulf-Dieter Geyer and Günter Harder; today the leaders are Christopher Deninger and Peter Schneider. What is most unusual about the *Arbeitsgemeinschaft* is the way in which the topics are chosen. On an evening during the meeting one of the *Arbeitsgemeinschaft* leaders assembles the group for a program discussion. In the first stage of the discussion people simply throw out suggestions for topics. At a recent discussion Deninger fielded twenty-two suggestions; many were in algebraic number theory and arithmetic geometry, but there was a wide range, from quantum electrodynamics to foliations to operads. The animated reactions ranged from dismissive snorts of laughter to respectful nodding of heads. A system of repeated votes whittles the list down to two: the chosen topic (in this case, "moonshine") and a backup.

Another activity at Oberwolfach is a series of advanced courses, formerly called DMV Seminars and now called Oberwolfach Seminars. These courses, which form the basis for a book series published by Birkhäuser, are designed to introduce young people to a currently active area of research. Since becoming director, Kreck has introduced two new activities at Oberwolfach. The first, supported by the Volkswagen-Stiftung, is called Research in Pairs, or RiP. (Compounding the morbidity of the acronym is the fact that the participants are sometimes referred to as "Rippers".) Under this program, pairs of researchers work together at Oberwolfach for periods ranging from two weeks to three months.

The only stipulation is that they cannot be from the same institution. Kreck has also introduced a new program of “miniworkshops”, to start in 2001. The regular meetings, as well as the Arbeitsgemeinschaften, typically have forty or fifty participants; by contrast, the miniworkshops will have only ten or twenty participants who will work together on a particular problem or learn about a new development. Three miniworkshops will be held in parallel during each of three weeks during the year. Kreck said he has the impression that these new activities are not well known, and he would like to encourage people, particularly those from the U.S., to apply to participate in them.

Running the Institute

For the regular one-week meetings at Oberwolfach, participation is by invitation only. However, after the topics of the meetings are made public, it is possible to write to the director to request an invitation. Not all invitees speak at all meetings, and in particular there is an unwritten rule that organizers do not speak except in unusual circumstances. Any person or group can submit a proposal to organize a meeting; for each week of the year, the institute typically has two or three meeting proposals competing for the slot.

Decisions about proposals are made by Oberwolfach’s twenty-member scientific board. To keep travel costs down, all the board members are from Europe. Eighteen are from Germany or the German-speaking part of Switzerland, and all are German-speaking. Kreck said that there is no formal rule limiting board membership to German speakers but that this *de facto* limitation facilitates communication in delicate matters. Batches of proposals are farmed out to the board members according to their areas of expertise. Then, at an intense one-day meeting of the board each October, proposals are selected to fill an entire year; for example, at the board meeting in October 2000 the program for the whole of 2002 will be fixed. This long lead-time means that the institute is sometimes slow in responding to new developments. As Kreck pointed out, “There is a positive effect of having this time lag: we don’t jump onto every fashion.” However, the institute has responded to the need for flexibility by establishing the miniworkshops, for which proposals need to be received only six months in advance.

When it comes to selecting proposals and setting institute policy, Oberwolfach’s scientific board has the final word. However, the director also has considerable influence. For example, Kreck has strongly encouraged organizers to limit the number of talks given during meetings in order to free up time for informal interactions. Tension has sometimes arisen over invitee lists, as organizers eager to invite all their colleagues run afoul of Kreck’s insistence that meetings not become too large. Kreck has also in-

stituted a rule that the organizing committee for every meeting must have at least one non-German member; in fact, these committees are not required to have any Germans at all.

As with many mathematics institutes, funding for Oberwolfach is somewhat precarious. Kreck said that it costs around 3 million DM (about US\$1.5 million) to run the full program of meetings each year. The primary source of funds continues to be the state of Baden-Württemberg, though economic difficulties have reduced the state’s contribution by about one-third over the past eight years. It is surprising that Oberwolfach relies mostly on state funding rather than

on funding from higher levels of government. For example, the institute receives no funding from the Deutsche Forschungsgemeinschaft (DFG), the major science-funding agency of the German government. The reason, Kreck explained, is that DFG offers only short-term funding rather than the long-term funding the institute needs. The Max-Planck-Gesellschaft (Max Planck Society), another major sponsor of research in Germany, supports many institutes, but these generally have a very different character from Oberwolfach. Oberwolfach also does not fit the mold of any of the science programs funded by the European Union.

Funding from private sources has partially made up for the shortfall in recent years. For example, the RiP program is presently supported by the Volkswagen-Stiftung; it will be continued with funding from the state of Baden Württemberg for three more years. A special grant, which ended this year, came from the Möllgaard-Stiftung to support the library. A substantial number of the Japanese visitors to Oberwolfach are funded through a special grant from the Japanese Association of Mathematical Sciences (of which the Fields medalist Heisuke Hironaka is president). In 1992 the Verein zur Förderung des Mathematischen Forschungsinstitutes Oberwolfach (Society of Friends of the Mathematical Institute Oberwolfach) was founded to encourage donations by individuals and corporations. The lack of a tradition of charitable giving in Germany makes this kind of fundraising difficult. Nevertheless, the society has raised funds for the Oberwolfach Prize of 10,000 DM, presented to a young European mathematician every two to three years. A year and a half ago, the society established the Oberwolfach



Current Oberwolfach director Matthias Kreck.

Foundation with the goal of starting an endowment to help support the institute.

When he became director, Kreck streamlined a complicated system whereby visitors paid for part of their accommodations and were reimbursed for train travel within Germany only. Today visitors receive free housing and meals, and travel expenses are covered only for meeting organizers. The bulk of the yearly budget goes into visitor accommodations, including a ten-person cleaning and kitchen staff. Approximately ten more staff attend to administration, computers, and the library. When money gets tight, Kreck said, he cuts corners by not doing maintenance on the buildings. So far the institute's library, which after forty years' careful tending is perhaps one of the top mathematics libraries in the world, has not suffered major cuts. However, Kreck said that, with the ending of the grant from the Möllgaard-Stiftung and with rises in journal prices, he may have to cut a substantial part of the library's 430 journal subscriptions unless he can find a new source of funds. "This is one of the few libraries that is more or less complete," he noted, "and once we have to cut, it will never again be on this level." The institute has an easier time with monographs than with journals: It has agreements with several of the major mathematics publishers to receive free books in exchange for displaying the books in the library's downstairs lobby.

The excellence of the library is one reason visitors love this institute: Not only is it unnecessary to bring stacks of books and papers to meetings at Oberwolfach, but many find there items unavailable at their home institutions. Another reason visitors love Oberwolfach is that it provides for all basic needs, leaving them able to devote their full attention to mathematics. There are two lecture rooms in the library building plus a seminar room. Most visitors stay in the main guesthouse, which has clean and simple rooms with beds, a desk, and a bathroom. A 1989 addition to the guesthouse includes an additional seminar room plus eight apartments designed for longer stays, which have living rooms and kitchens. There are also five more apartments in a separate building. Breakfast, lunch, and dinner are served family-style in the institute dining room in the main guesthouse. For meeting organizers there are essentially no logistical details to attend to, so they need focus only on assembling the list of participants to invite.

The administration of the institute runs like clockwork, and it can sometimes be just as inflexible. For example, Oberwolfach has settled into a regimented schedule in which meetings must be held Monday through Friday and guests must clear out on Saturday. The schedule sometimes makes meetings difficult for those who travel by plane and need a Saturday-night stay to get a reasonable airfare, or for Germans who teach during the week.

When a guest must stay over Saturday, the institute will reserve a room at a nearby hotel or try to provide an additional night's stay. But changing the meeting schedule would mean coming up against long-standing German traditions about workdays: Kreck explained that getting a cleaning and kitchen staff to work on Sunday would be prohibitively expensive and, given the isolated location of the institute, perhaps impossible.

The out-of-the-way location also brings some inconveniences; for example, the nearest cash machine is a one-hour walk from the institute, in the neighboring village of Oberwolfach-Kirche. But most visitors welcome the isolation, which is heightened by the absence of televisions, radios, and telephones in the guestrooms (the apartments, because they are designed for longer stays, have telephones). There is also a sense of relaxed informality at Oberwolfach that is no doubt inspired by the bucolic views of the Black Forest and by the fresh, woodsy air. This sense is deepened by the dining room ritual of randomly mixing up the seating of the visitors for lunch and dinner and by the fact that there are no locks on the doors of the guestrooms. Groups of mathematicians in animated discussion can be found strolling through the woods during the hike that takes place every Wednesday. A bus excursion is a possible substitute in case of wet weather, but usually participants just tote their umbrellas and get happily soaked. Some afternoons soccer games are arranged on an open field next to the sparkling Wolf River. The library building has a music room equipped with a grand piano, violin, cello, and guitar, and often participants organize impromptu concerts during meetings. In the evenings visitors can be found gathered in small groups all over the library or the dining room. Drinks and snacks are available by a convenient honor system whereby one enters on a logsheet what one consumes and puts payment into a cash box. Photocopying and printing are handled in the same, unfussy way.

Amid the serene hills of this Black Forest valley, it is difficult to imagine those final days of the war, when twenty people holed up at the Lorenzenhof, wondering where their next meal would come from and laying plans for escape should an army come through. What is easier to imagine is the inspiration for establishing a mathematics institute here in a place so suited to contemplation. The strange brew of impulses, sinister and idealistic, out of which the institute was born in 1944 today gives visits there an affecting resonance.

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About the Cover



This photograph shows one of the buildings of the **M a t h e m a t i s c h e s** Forschungsinstitut Oberwolfach, with a view of the Schwarzwald (Black Forest) in the background. This building houses the library, the main seminar rooms, and the administrative offices. On the right in the foreground is a metal sculpture of Boy’s surface, a gift to the institute from Daimler-Benz. An article about the sculpture “Die Boysche Fläche in Oberwolfach,” by Hermann Karcher and Ulrich Pinkall, appeared in the *DMV-Mitteilungen*, 1 (1997), pages 45-47.

—A. J.