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Of Moths and Men: Theo Lang and the Persistence
of Richard Goldschmidt's
Theory of Homosexuality, 1916-1960

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ABSTRACT – Using an analogy between moths and men, in 1916, Richard Goldschmidt proposed that homosexuality was a case of genetic intersexuality. As he strove to create a unified theory of sex determination that would encompass animals ranging from moths to men, Goldschmidt's doubts grew concerning the association of homosexuality with intersexuality until, in 1931, he dropped homosexuality from his theory of intersexuality. Despite Goldschmidt's explicit rejection of his theory of homosexuality, Theo Lang, a researcher in the Genealogical-Demographic Department of the Institute for Psychiatric Research in Munich, revived it, maintained Goldschmidt's association with it, and argued on its behalf in publications from 1936 to 1960. Lang's appropriation of Goldschmidt's theory did not depend on his resolution of the difficulties Goldschmidt had found with his own theory. Lang and Goldschmidt, I argue, had fundamentally different scientific and social commitments that allowed one to reject this theory of homosexuality and the other to accept it.

Next to Trofim Lysenko, Richard Goldschmidt is the most controversial geneticist of the twentieth century. Remembered today for his 'heretical' views concerning evolution and his campaign against the existence of Thomas Hunt Morgan's 'classical' gene, Goldschmidt has become biology's anti-hero (Allan 1974; Richmond 1986; Wallace 1985, 38). To biologists such as Ernst Mayr, Goldschmidt was mistaken at best and 'intellectually dishonest' at worst (Mayr 1980, 421; Mayr 1982, 381). Yet, Stephen Jay Gould and others have made great use of Goldschmidt's 'heretical' status and long neglect to set their own work apart from the *status quo* (Gould 1980; 1982; Bush 1982). While contemporary associations with Richard Goldschmidt draw our attention to his 'heretical' genetics and evolutionary biology (Raff and Kaufman 1983), historical examination reveals that much of Goldschmidt's scientific career was spent on the problem of sex determination in the gypsy moth, *Lymantria dispar* (Dietrich 1995; Littlefield and Bryant 1980; Allen 1980). Indeed, Goldschmidt's years of work on sex determination are rarely mentioned at all by biologists after 1950, with one exception. One aspect of Goldschmidt's research on sex determination continued to be cited and discussed long after

Goldschmidt himself had rejected it as unsound; namely, his theory of homosexuality.

In 1916, Richard Goldschmidt took it upon himself to replace what he saw as the pervasive, but intuitive, understanding of human homosexuality and hermaphroditism with a scientific theory solidly based on an exact experimental foundation (Goldschmidt 1916b).¹ He did not propose transplantation experiments such as Eugen Steinach was then performing (Steinach 1916; Sengoopta 1992, 266-267; Sengoopta 1998), but built an analogy to the animal kingdom. Only a few years earlier Goldschmidt had discovered that he could produce a series of intergradations between male and female by mating different geographic varieties of the gypsy moth, *Lymantria dispar* (Goldschmidt 1911; 1912). That is, in controlled breeding experiments he could produce a complete series of genetically male moths which showed increasing physical resemblance to an adult female moth. Working as director of his own section at the prestigious Kaiser Wilhelm Institute for Biology in Berlin-Dahlem, Goldschmidt extended his theory of sex determination and intersexuality from *Lymantria* to humans in 1916 and over the course of the next twenty years to intermediate representatives of the animal kingdom, including mammals, birds, amphibians, and reptiles.

From our contemporary perspective, jumping from moths to men may seem extremely problematic (Schoppmann 1991, 128). Certainly Goldschmidt realized that the analogy he proposed needed detailed defense, which he tried to provide and which will be discussed below. Nevertheless Goldschmidt held on to this analogy between moths and men for fifteen years. In 1931, however, he reversed his position and explicitly excluded homosexuality from his theory of sex determination (Goldschmidt 1931). Despite Goldschmidt's rejection of his own theory, in 1936, his theory of homosexuality as a form of intersexuality was revived by Theo Lang and developed within the framework of psychiatry and medical genetics then prominent in Germany (Lang 1936).

Lang was an assistant in Ernst Rüdin's Geneological-Demographic Department within the German Institute for Psychiatric Research located in Munich (Weber 1993; 1996). An early supporter of National Socialism, Lang served as a founder and Vice-Chairman of the National Socialist Physicians' League (*Nationalsozialistischer Deutscher Ärztebund – NSDÄB*) in 1929 (Proctor 1988, 30, 213; Weindling 1989,

¹ Homosexuality, defined minimally as same sex attraction, and hermaphroditism, defined minimally as having sexual characteristics of both sexes, were not clearly distinguished by Goldschmidt and many of his contemporaries in the early twentieth century.

479). At a time when many of Goldschmidt's books had been banned in Berlin and Goldschmidt himself had been removed from his position at the Kaiser Wilhelm Institute for Biology (Goldschmidt 1960), Lang chose to pursue an approach to the genetics of homosexuality that explicitly built on Goldschmidt's theory of intersexuality. Lang could have appropriated Goldschmidt's results without citation, but in all of his publications on homosexuality he carefully maintained the association with Goldschmidt and his particular approach to sex and sexuality. This paper concerns how and why Lang appropriated and revitalized Goldschmidt's theory of homosexuality as intersexuality.

Goldschmidt's theory was revived by Lang so that it could be used as a foundation for his own statistical, demographic approach to genetic disorders. Appropriating Goldschmidt's theory of homosexuality as intersexuality was a means for Lang to address a socially and medically significant question. Appropriating Goldschmidt's theory also allowed Lang to appropriate Goldschmidt's scientific authority on the genetics of intersexuality, and, in doing so, refashion himself as a comprehensive biologist instead of the narrow specialist that he had become. While Goldschmidt's rejection of his own theory was noted by Lang, I will argue that Lang's appropriation of Goldschmidt's theory did not depend on his resolution of the difficulties which Goldschmidt found with his own theory. Lang and Goldschmidt, I will argue, had fundamentally different scientific and social commitments that allowed one to reject this theory of homosexuality and the other to accept it.

Sex Determination and Intersexuality

Richard Goldschmidt came to the issue of homosexuality through his study of intersexuality and sex determination. As an assistant in Richard Hertwig's laboratory in Munich, Goldschmidt had been immersed in the problem of sex determination early in his scientific career. Although his own work was initially on the development of nervous systems, with the rise of genetics, Goldschmidt decided to approach the topic of sex determination from a Mendelian standpoint. Using different varieties of the gypsy moth, *Lymantria dispar*, Goldschmidt discovered in 1911 that he could produce a kind of intermediate between male and female. The discovery of these sexual intergrades, which he called intersexes, spurred Goldschmidt to develop a theory of genetic action that could explain this sexual plasticity. As would become typical of Goldschmidt's approach, he

developed an understanding of genetics that integrated heredity and the process of development (Richmond 1986; Maienschein 1984; Gilbert 1978).

Goldschmidt was able to produce intersexes in Gypsy moths by mating male and female moths from Europe and Japan. By 1914, Goldschmidt claimed that the key to explaining these intergrades was a balance of male and female genetic factors.² Goldschmidt thought that each individual contained 'the *anlagen* for either sex' (Goldschmidt 1916a, 709).³ Which sex appeared depended on the quantitative relation between the strength of the factors. Each factor did not produce a unitary trait; it produced some substance (an enzyme or hormone perhaps) in some quantity. Because quantity and rate of production could vary, the potency or valence of the factor was said to vary, to lie in a range from strong to weak. According to Goldschmidt a normal female contained two female factors (FF) and was heterozygous for the male factors (Mm). Females were thus designated FFMm, while males were designated FFMM. If both factors in the MM pair were weak and both FF were strong, the female would predominate over the male and produce an intersex or even possibly a male which appeared completely female. Different geographic varieties of *Lymantria* had factors of differing strengths. As a result, crossing different varieties could produce intersexual offspring. Because the production of male and female moths depended on the balance of male and female factors, Goldschmidt named his theory, the balance theory of sex.

In 1916 Goldschmidt believed that there were only two experimental approaches to the problem of sex determination: castration and transplantation experiments, such as Eugen Steinach was performing mainly on rodents, and his own experimental production of intersexuals achieved by crossing different geographic varieties of Gypsy moths. It was important to Goldschmidt to ground his theory of sex determination on an experimental basis. From his perspective, 'there is hardly another problem which has been such a playground of dilettantism, and if we look through the older literature on the sex problem, we find almost as many philosophers and economists inventing sex-theories as there are biologists'

² Prior to 1914, Goldschmidt considered sex determination to be a balance of multiple hereditary factors. By 1914 Goldschmidt had narrowed his theory to just sex factors. See Marsha Richmond for a detailed explanation of the development of Goldschmidt's research on sex determination. Richmond 1986, 137-233.

³ The idea that each individual contained the *Anlagen* for both sexes was widespread even if agreement about its implications was not. See Sengoopta 1992, 257-261.

(Goldschmidt 1916a, 705). Although Goldschmidt does not mention them by name as dilettantes, it is clear that he is responding to the growing number of sex researchers and the new field of sexual science.

The most prominent proponent of sexual science and homosexual rights in early twentieth century Germany was Magnus Hirschfeld. Hirschfeld began researching and campaigning for homosexual rights in the 1890s and, as a founder of the Scientific-humanitarian Committee, began to edit the *Jahrbuch für sexuelle Zwischenstufen* in 1899. Hirschfeld himself advocated a scientific understanding of homosexuality and argued that homosexuality was a type of sexual intergrade stemming from 'an inner constitutional factor' (quoted in Sengootpa 1992, 264). Hirschfeld went on to develop this idea into a hereditary theory of inborn homosexuality, where homosexual preference could remain latent and so produce a continuous or interrupted genealogical series (Hirschfeld 1903; Herrn 1995, 37-38). Although homosexual preference would thus be biologically determined, as might differences in sexual characteristics, Hirschfeld still treated them as anomalies, as errors of development, because they were intermediate between male and female.

It is crucial to note that for Hirschfeld the scientific understanding of homosexuality and the political campaign to repeal the German statute outlawing homosexual acts (Paragraph 175) were inextricably linked. Hirschfeld's strategy and the strategy of the Scientific-humanitarian Committee was to argue for repeal of Paragraph 175 by claiming that homosexual preference was a biological phenomenon, not a psychiatric pathology. Homosexuals, thus, should not be punished for their biologically determined preferences. In so far as Hirschfeld was emblematic of research on homosexuality, taking a stand on the biological grounding of homosexuality had distinct political implications – claiming that homosexuality was biological and especially genetic, until the 1930s, carried with it the implication of a tolerance for homosexual behavior and an intolerance for Paragraph 175.

During the First World War, Hirschfeld and the committee publishing the *Jahrbuch* devoted themselves to the war effort by documenting the heroism and experience of homosexual soldiers and, in doing so, defended the usefulness of homosexuals in the German military. The committee even changed the name of their journal to the *Vierteljahrsberichte des Wissenschaftlich-humanitären Komitees während der Kriegszeit*. Every issue of the yearbook during this time had some news and defense of the contribution of homosexuals to the military effort (Wolff 1986, 157-166; Herzer 1992; Steakley 1997).

Goldschmidt was not in Germany during the First World War. Shortly after being appointed to the new and prestigious Kaiser Wilhelm Institute for Biology in 1914, he traveled to Japan to collect samples of Gypsy moths from different regions of the Japanese archipelago. Goldschmidt would use these different geographic varieties to systematically study the effects of cross breeding and geographic separation on the production of intersexes. When war broke out, he tried to get back to Germany *via* the United States, but was denied permission to repatriate. Stuck in the United States for the duration of the war, Goldschmidt brought his family over from Germany to New Haven where he had been provided a place to work as a guest in Ross Harrison's laboratory at Yale University.

During his stay in the U.S., Goldschmidt was an outspoken advocate for all things German. Sewall Wright remembered him from their time together at Harvard's Bussey Institute during 1915 as 'very bitter about the U.S. and extremely loyal, pro-German at that time' (Wright 1976, 3). In his autobiography written many years after the events of the First World War, Goldschmidt remembered that 'I felt strongly that my fatherland was being maligned, and I had to say so—and this was not cautious or wise. But I did not think honesty in discussions was damnable. I have learned much since' (Goldschmidt 1960, 155). With the entry of the United States into the war, the Goldschmidt family became enemy aliens and began to keep more and more to themselves to avoid the hostility of American war hysteria. This need for caution was confirmed when, in 1918, Goldschmidt was arrested on suspicion of spying and sent to a prison camp in Georgia for the remainder of the war (Goldschmidt 1960, 166-182).

Before his internment, Goldschmidt was actively researching and writing on intersexuality. In 1916, he asked Charles Davenport, director of the Eugenics Record Office, to help him find copies of the *Jahrbuch für sexuelle Zwischenstufen* so that he could research the heredity of homosexuality. As Goldschmidt explained to Davenport, who at that time had collected no cases of homosexuality, 'according to Moll and Hirschfeld heredity is proven in 35% of the cases'.⁴ While Goldschmidt never explained his motivations, there are at least two plausible explanations for his extension of his theory of intersexuality to human homosexuality. On the one hand,

⁴ Richard Goldschmidt to Charles Davenport, February 7, 1916 and Charles Davenport to Richard Goldschmidt, February 10, 1916. Charles Davenport Papers, American Philosophical Society Archives, Philadelphia, PA.

Goldschmidt may have been responding to criticisms that the German army was weakened by the presence of homosexuals.⁵ By explaining homosexuality as a normally occurring biological state, he was in effect defending the strength of the German army. Reading the *Jahrbuch* would certainly have alerted Goldschmidt to this strand of thought and given the hostile, anti-German atmosphere he was in, Goldschmidt may have decided to lend his voice to this cause (Lauritsen and Thorstad 1974, 25-27; Steakley 1975). On the other hand, Goldschmidt may have been trying to offer a more 'scientific' interpretation of homosexuality as intersexuality than that offered by Magnus Hirschfeld in his *Homosexualität des Mannes und Weibes* (Hirschfeld 1914). Goldschmidt used the same terminology as Hirschfeld (*sexuelle Zwischenstufen*) and proposed a similar kind of theory (homosexuality as sexual intergrade). But where Hirschfeld's approach was to compile evidence in a case history fashion, much of which was anecdotal, Goldschmidt approached the issue experimentally to get at what he thought were its biological foundations. Goldschmidt used the experimental nature of his research as a means both of claiming greater authority to speak on the science of intersexuality and of differentiating himself from Hirschfeld and others.

The key to Goldschmidt's 1916 paper on the biological foundations of contrary sexuality and hermaphroditism was an analogy between experiments in Gypsy moths and the situation in humans. He built and defended this analogy as follows: first, he noted that both humans and moths have sex chromosomes so, in both, sex could be put on a genetic basis. There was the problem that humans were strongly affected by sex hormones in a way which appeared very different from Gypsy moths, but Goldschmidt thought that the basic mechanism could be the same nevertheless (Goldschmidt 1916b, 7). To circumvent the issue of hormonal action in higher animals, Goldschmidt admitted two possibilities: (1) an abnormal factor constitution without hormonal influence could produce intersexes, or (2) hormones could act to produce differences in sexual characteristics with the same effects as abnormal factor constitution. Goldschmidt also thought that there was a practical difference between these views; if (2) was the case, Steinach's experiments on castration and transplantation ought to be able to reverse homosexuality (Goldschmidt 1916b, 13-14).

⁵ From 1907 to 1909, the Eulenberg Affair in Germany saw high ranking government officials and military officers embroiled in scandal when their homosexuality was made public. According to historian James Steakley, 'The Eulenberg Affair was recalled during the war not just in Britain: cartoonists in both France and Italy revived motifs from the era of the scandal, portraying the German army as perversely effeminate and thus easily defeated' (Steakley 1992, 353).

Of course, the analogy depended on making homosexuality a type of intersexuality. In humans, 'contrary sexuality' was considered abnormal or pathological by most researchers. To counter the tendency to think of homosexuality as a psychiatric disorder, Goldschmidt argued that over 50% of human homosexuals came from 'healthy families'. He did not defend homosexuality as normal, but did try to make it the result of a biological process that ought not to be considered a psychopathology.

It was significant that in both moths and humans the sexes were not discrete. In both there were a series of intergrades. In moths, Goldschmidt had been able to experimentally produce complete series of intergradations. Homosexuality represented a point near the end of an intersexual series; it was an example of almost complete sexual inversion. In other words, as a sexual inversion, a genetic female would have all of the outward characteristics of a male, but not necessarily the behavioral characteristics when it came to sexual orientation. Conversely, a genetic male would have all of the outward characteristics of a female, but not necessarily a female sexual orientation. The presence of homosexual behavior, however, was not by itself enough to claim that the bearers of that behavior were intersexual. There needed to be evidence that sexual intergradation was possible in the species in question. Goldschmidt demanded a higher standard of evidence here, because results across different animal groups did not all reveal series of sexual intergradations. In humans, series of intersexes had been documented by well known sex researchers such as Richard von Kraft-Ebing, Albert Moll, and F. L. Neugebauer (Kraft-Ebing 1965; Moll 1891; Neugebauer 1908). These different researchers identified homosexual behavior with different levels of intersexuality. An important unifying feature of Goldschmidt's theory of intersexuality was that homosexuality, hermaphroditism, and pseudohermaphroditism were all phases of intersexuality. Where previous researchers had documented these diverse phenomena, Goldschmidt saw himself as providing the experimental grounding that would establish a unified understanding of intersexual phenomena (Goldschmidt 1916b, 2-3). It was important to Goldschmidt that the manifestation of contrary sexual instincts also be unified across species as characteristic of a specific level of sexual intergradation (Goldschmidt 1916b, 11; Goldschmidt 1917, 446).

In the Gypsy moth case, intersexes were produced by the interbreeding of different geographic races. In the human case, making the analogous claim was problematic for two reasons. First, Goldschmidt thought that there was not enough evidence to say that homosexuality was the product

of unions between different geographic varieties. Although he did note that unions between Bavarians and German nobility did produce more homosexual offspring than usual, he ultimately called for more ethnographic research. Second, because of extensive intermixing, Goldschmidt thought that the concept of a geographic variety did not hold well for humans (Goldschmidt 1916b, 8-9).

Goldschmidt also thought that his view had certain social implications. First, he thought that it must be acknowledged that homosexuals are intersexuals. Second, it had to be acknowledged that intersexes have a genetic basis which can produce physical and mental intersexuality of all grades. Last, intersexual individuals (like hermaphrodites) ought to be treated in the 'spirit of the Prussian law'; namely, an individual should be free to do as he pleases unless he interferes with the welfare of society. He did not call for a repeal of Prussian code paragraph 175 outlawing homosexual acts, but he made a case for tolerance (Goldschmidt 1916b, 14).

Unifying the Biology of Sex

From 1916 to 1931, Goldschmidt continued to develop his theory of sex determination dominated by the desire to produce a strongly unified theory. Goldschmidt thought that he had discovered a fundamental biological principle, a new law of biology. In his efforts to understand the mechanism for intersexual development, Goldschmidt began to chart the development of different distinguishing sexual characteristics. What he found was that even though all of the body's cells had the same genetic components and so the same genetic basis for sex characteristics, adult intersexual organisms frequently appeared as mosaics of different sexual characteristics, some male, some female, some intermediate. To explain why intersexual organisms were not uniform in their expression of intersexual characteristics, Goldschmidt proposed what he called the Time Law of Intersexuality. In his words, 'An intersex is an individual which has developed as a male (or female) up to a certain time point; from this turning point the development has continued as a female (or male). The increasing degree of intersexuality is an expression of the recession of the turning point, that is, its occurrence at an earlier stage in development. And lastly, the condition of any particular organ is determined by the time of its differentiation – whether it is before or later than the turning point' (Goldschmidt 1923, 91; Allen 1980). Different organs could, thus, express different sexual or intersexual characteristics. The time law was derived from

the type of sex determination process that Goldschmidt studied in Gypsy moths, but in the higher vertebrates such as birds and mammals, its application was more complicated.

Starting in 1917, Goldschmidt distinguished between what he called zygotic intersexuality and hormonal intersexuality (Goldschmidt 1917). Zygotic intersexuality applied to animals up to the level of birds and was characterized by the fact that every body cell has the same sex determiners, with differences of expression being strictly a product of the time law. Among the higher vertebrates, hormonal intersexuality was the rule. Hormonal intersexuality was distinguished from zygotic cases by being the result of hormone action later in the life cycle and by the more centralized control of hormone producing organs. In zygotic cases, each cell produced hormones or sex enzymes, so the production of intersexual characteristics had to be grounded in their shared genetic basis. Because hormone action was localized in higher vertebrates, it was possible to have hormonal action independent of zygotic constitution; *e.g.*, transplanting hormone producing tissue could alter the expression of intersexuality.

The difference between zygotic and hormonal intersexuality bore directly on the analogy between moths and humans. Moths were the paradigm example of zygotic intersexuality while humans were clearly hormonal (Oudshoorn 1994). Goldschmidt never resolved the extent to which the production of hormonal intersexuality followed the time law. In 1916, his worry about identifying a stage of intersexuality identified with homosexual behavior could be read as an effort to determine how human intersexuality would follow a time law. That he called for more investigation on the expression of intersexual characteristics at different stages in 1916 suggests that Goldschmidt had not fully resolved the issue of the genetics of homosexuality. Indeed, in *The Mechanism and Physiology of Sex Determination*, written in 1918-1919 and published in German in 1920, Goldschmidt claims that the cause of human intersexuality is not known, 'so that we cannot even say whether it is zygotic or hormonal' (Goldschmidt 1923, 243). The situation was made worse because at the time there was no way of determining genetic sex in humans; the possibility of complete sexual exchange made external appearances an unreliable guide. A cytological basis for judging genetic sex in humans would not be established until the 1950s (see below). Nevertheless, Steinach's experiments castrating and transplanting testes and ovaries in rodents suggested that hormones were directly involved in the production of pseudohermaphrodites. Frank Lillie's study of free martins in cattle also suggested to Goldschmidt that male intersexuality could result from exposure to maternal hormones *in utero* (Clarke

1998). Noting the uncertainty of all of these studies, Goldschmidt still concluded that it was probable that pseudohermaphroditism was a case of zygotic intersexuality leading to intersexual hormonal activity (Goldschmidt 1923, 247-249). In the end, the impression conveyed by Goldschmidt in the early 1920s was that the genetic basis of human intersexuality and homosexuality was unsettled.

Part of Goldschmidt's growing ambivalence toward homosexuality also may have had to do with the fact that homosexuality was being politicized differently in interwar Germany. The 1920s were the time of the homosexual emancipation movement in Germany. In 1919, Magnus Hirschfeld founded the Institute for Sexual Science in Berlin (Steakley 1975; Oosterhuis 1991; Fout 1992). In fact, Hirschfeld was so taken with Goldschmidt's experiments that in 1920, the *Jahrbuch* reports that he had obtained a colony of moths to begin his own breeding experiments (Herrn 1995, 38). The results of his efforts are lost, but, in general, the reception of Goldschmidt's 1916 paper in Germany was very positive. A review in the *Jahrbuch für sexuelle Zwischenstufen* praised its effort to unify medical and biological knowledge (Hodann 1917). In 1920, Kurt Wolff, a young medical researcher, also followed up on Goldschmidt's suggestions and began using the patient records at Hirschfeld's institute to evaluate the inheritance of homosexuality. Using pedigrees of families with homosexual members and Wilhelm Weinberg's proband method to analyze hereditary patterns, Wolff concluded in support of male intersexuality resulting from 'shifting valences of sex factors', thereby making human homosexuality zygotic (Wolff 1922). Goldschmidt cites Wolff's work but admits that the results must be treated with caution (Goldschmidt 1927, 654). Indeed, Goldschmidt seems to have wanted to distance himself from Hirschfeld and homosexuality research altogether by 1920. When Julian Huxley wrote to Goldschmidt to discuss his own work on homosexuality, he thanked Goldschmidt for references to Hirschfeld and noted that he would 'be sure not to mix [Goldschmidt] up in the matter!'⁶ When Goldschmidt finally renounced his position in 1931, Richard Hertwig wrote to Goldschmidt applauding his decision to deny that homosexuality was a type of intersexuality. In Hertwig's words, 'It was frightening that the defenders of homosexuality could be taken as authorized to storm the ominous paragraph in a new battle.'⁷ Defending a genetic theory

⁶ Julian Huxley to Richard Goldschmidt, November 9, 1920, p. 2. Richard Goldschmidt Papers, Bancroft Library, University of California, Berkeley.

⁷ Richard Hertwig to Richard Goldschmidt, February 24, 1931. Richard Goldschmidt Papers, Bancroft Library, University of California, Berkeley.

of homosexuality had raised questions about its potential social ramifications which had left Goldschmidt unsettled and cautious.

In his final survey of the topic of intersexuality in *Die sexuelle Zwischenstufen*, Goldschmidt broke completely with his 1916 view of homosexuality. He wrote,

As far as human homosexuality is concerned, the biologist must be extremely cautious in commenting on this much disputed field. I concede that during an earlier period (1916) I was less cautious and believed, on the basis of extensive studies of the literature, that it was justified to classify the clearly congenital form of homosexuality as an incipient form of intersexuality. At present I can no longer hold this position (Goldschmidt 1931, 432).

He went on to say that homosexuality could not be assigned a place in the series of intersexes, and that homosexuality was probably the result of an inherited change in the reactivity of brain tissue to hormones. Although Goldschmidt does not explain his views any further, one could still say that homosexuality was genetic, but not that it was a type of intersexuality. Moreover, this alternative genetic process was vague and less fundamental than that which produced intersexuality. From Goldschmidt's perspective, it had fallen out of the range of the biological laws that he championed for sex determination and intersexuality.

Maintaining a scientifically and politically problematic theory of homosexuality detracted from the generality of his theory of intersexuality, and Richard Goldschmidt valued unification (Dietrich 1996; 2000). As a biologist trained in turn-of-the-century Germany, Goldschmidt had what historian Jonathan Harwood calls a comprehensive style of scientific thought. In other words, Goldschmidt, and many other German comprehensive biologists, were marked by 'their broad approach to the problems of genetics, their attitudes toward breadth of biological knowledge, and their cultivation of artistic sensibility, the recurring theme of striving for an all-embracing conceptual synthesis, occasionally manifest in sympathies for holism' (Harwood 1993, 270). Throughout all of his work, Goldschmidt consistently strove to build a unified understanding of vast arrays of biological phenomena. In his work on sex determination, he produced a multitude of technical articles on the evidence and mechanisms of sex determination in *Lymantria*, but, at the same time, strove to generalize his findings as laws of nature. Goldschmidt's *Die sexuellen Zwischenstufen* was the culmination of his research on sex determination and his last attempt to generalize his findings from insects to humans. It was also a reflection of the comprehensive spirit of unification that had driven twenty years of research.

A Revival in the Nazi Era

With the rise of National Socialism, attitudes toward homosexuality in Germany changed for the worse. In May 1933, Magnus Hirschfeld's Institute for Sexual Science in Berlin was destroyed and over 12,000 of its books were publicly burned. These purges of 'objectionable materials' also resulted in many of Goldschmidt's books being removed from various libraries and their sale or listing in publishers' catalogues prohibited (Goldschmidt 1960, 278). On June 28, 1934, Ernst Röhm, a prominent friend of Hitler's, was murdered during the Night of the Long Knives. Hitler justified this killing by pointing out that Röhm was a homosexual (Burliegh and Wipperman 1991, 188-190). On the anniversary of this occasion in 1935, Paragraph 175 was revised to include, as 'criminally indecent' acts, a kiss, an embrace, or even homosexual fantasies. Historian James Steakley has reported that one man was successfully prosecuted for observing a couple making love in a park but only looking at the man (Steakley 1975, 103-119). It was in this climate of Nazi racial and sexual ideology that Goldschmidt's theory was revived by Theo Lang.

Lang was a physician and researcher at the German Institute for Psychiatric Research in Munich. As a member of Ernst Rüdin's Genealogical-Demographic Department, Lang was an expert in using mathematical methods for discerning Mendelizing traits in various populations. Born in Augsburg in 1898, Lang served in the infantry during the First World War until he was captured and placed in an English prisoner of war camp. After the war, Lang studied medicine, taking his state exams in 1923. A series of assistantships in various hospitals and clinics came to an end in 1926, when Lang accepted a research position under Ernst Rüdin in the Genealogy and Demography section of the German Institute for Psychiatric Research (*Deutsche Forschungsanstalt für Psychiatrie*).⁸

Founded by Emil Kraepelin in 1916, the institute emphasized the biological foundations of psychiatry and was a model of empirical psychiatric research for its time (Mazumdar 1996, 642-643; Weber 1993). Rüdin was named Director of the Genealogy and Demography section when the institute was founded and became Kraepelin's successor after Kraepelin's death in 1926. Under financial pressure, the institute had become part of the *Kaiser-Wilhelm-Gesellschaft* in 1924 and secured substantial support from the Rockefeller

⁸ 'Lebenslauf von Dr. med. habil. Th. Lang,' January 17, 1939, pp. 109o-109p, Beschwerde Dr. Lang, Personalangelegenheiten, I.1A.2457, Archiv zur Geschichte der Max-Planck-Gesellschaft, Berlin-Dahlem.

Foundation beginning in 1927 (Mazumdar 1996, 643). In the early 1920s, Rüdin led the institute's Genealogical and Demographic research away from the calculation of Mendelian ratios toward what he called *empirische Erbprognose* (empirical hereditary prognosis). Using the institute's extensive data bases on various psychiatric disorders, Rüdin's approach emphasized the statistical analysis of individuals and their families with the goal of estimating genetic risk by calculating the expected number of affected relatives for each type of disorder (Mazumdar 1996, 645). This approach emphasized phenotypes and their distribution over genotypes and their mechanisms. Armed with this statistical approach, workers in Rüdin's institute could estimate the genetic load (*erbliche Belastung*) of a family and could identify the risk of latent carriers of a genetic/psychiatric condition. Rüdin's faith in this approach, also contributed to his forceful advocacy of eugenic measures such as sterilization, which he saw as a 'practical result' of this type of research (Mazumdar 1996, 649-650).

Prior to 1935, Lang's research at the institute concentrated on patterns of inheritance of feeble-mindedness and cretinism as well as the effects of radiation on patterns of inheritance for goiter (Hartman 1936, 417-418; Lang 1938). Like his later work, Lang's research on feeble-mindedness was strongly statistical, and, as a member of Rüdin's research staff, was influenced by Rüdin's statistical demographic approach.

In 1935, Lang met with Goldschmidt and Richard Hertwig in Munich and had, in his words, a 'heart to heart talk' about the genetics of intersexuality and homosexuality (Lang 1936, 702). At the time of his meeting with Lang, Goldschmidt knew that he had to leave Germany. He had kept his position as long as he had only with Max Planck's intervention on his behalf. Nevertheless, Goldschmidt was very careful about letting his plans be known. Karl von Frisch reports that on a visit to Munich just before Goldschmidt left for America, he only told von Frisch of his plans to leave the country once they were in the 'deepest cellar recesses' at the Zoological Institute (von Frisch 1967, 126). Goldschmidt himself had been an advocate of eugenic sterilization before the Nazi period and had been a member of the Prussian Health Ministry committee charged with drafting Germany's voluntary sterilization law (Weindling 1989, 455). Nevertheless, he did not share Lang's attitude toward race hygiene and had reason for caution given his imminent departure. Lang gave the impression that Goldschmidt and Hertwig were encouraging and, in fact, in 1937 requested funds from the Rockefeller Foundation to

travel to the United States to attend a conference and discuss his research with Goldschmidt.⁹ If Lang wrote to Goldschmidt directly, Goldschmidt chose not to save the letters.

Lang was an enthusiastic supporter of National Socialism. As a founding member and Vice-chairman of the National Socialist Doctors' Association (Proctor 1988, 213; Weber 1993, 245; Weber 1996, 329), he contributed to the *Nationalsozialistische Monatshefte* on topics such as National Socialism as the political expression of biological knowledge (Lang 1930) and the biological burden of Judaism (Lang 1932). In these articles, Lang argued for the genetic basis of individual and racial differences. In the case of Judaism, he argued that Jews had higher proportions of blindness, deafness, and mental disorders than did other major religious groups. This created a large biological burden (*Belastung*) for the German people that Lang feared would worsen as the 'morbid genes' of the Jews spread through the German population (Lang 1932, 126).

Within Rüdin's institute, Lang was known for his political motivation (Weindling 1989, 480; Weber 1993, 245). In 1931, a reorganization of the NSDÄB had removed Lang from his position, but he continued to cultivate connections within the Nazi hierarchy. In 1932, for instance, Lang wrote to Herman Boehm and Bruno Schultz arguing that Herman Muckermann's promotion of eugenics was at odds with Nazi racial hygiene (Weingart *et al.* 1988, 386-389). The next year Schultz, who was an SS member of the Munich Racial Hygiene Society, along with other right-wing racial hygienists, publicly denounced Muckermann and Eugen Fischer. As a result, control of the German Racial Hygiene Society passed from Fischer to Rüdin (Weindling 1989, 508). No stranger to politics, I believe that Lang saw research on homosexuality, especially after the Night of the Long Knives, as a topic that could further his ambition for a higher place in the Nazi hierarchy.

In 1936, Lang published his first study on homosexuality. His research was explicitly described as an attempt to extend Goldschmidt's theory and to provide evidence in its favor. Using the statistical methods adapted to psychiatric research by Rüdin, Lang wanted to demonstrate that homosexuality was a genetically based form of intersexuality. Lang constructed his database using Munich police records for those arrested for violations of Paragraph 175 or for homosexual prostitution. Very few of these records were for women

⁹ Theo Lang to P. O'Brien, December 1, 1937. Forschungsanstalt für Psychiatric, München, Research, 1936-1940. Rockefeller Foundation, RG 1.1, 717, 10, 58. North Tarrytown, NY.

(Lang 1936, 703), in part a result of the fact that female homosexuality was not outlawed under Paragraph 175 (Schoppmann 1991). Lang hoped to address this problem in the future with data from Dr. Jane Gay of the Psychiatric Division of the Payne Whitney Clinic in New York (Lang 1936, 712). Nevertheless, from the Munich police records, Lang identified 500 subjects or probands for analysis. As in the analysis of other psychiatric traits, Lang looked for associations between homosexuality and religion, father's age, mother's age, and difference in parental ages. Most significantly, however, Lang analyzed the sex ratios in families of persons arrested for homosexual offenses. The normal sex ratio at the time was understood to be 106:100, males to females. If homosexuals were intersexuals, then they should be genetically female.¹⁰ This meant that there should be a higher proportion of brothers or males in their families. If the ratio of males to females was significantly elevated beyond the normal value of 106:100, Lang could argue that Goldschmidt's theory of homosexuality as intersexuality was confirmed. Using the 468 cases where comparison between full siblings was possible, Lang calculated that the ratio of males to females was 121.8:100 (Lang 1936, 710). While Lang admitted that there were difficulties still to be resolved, he argued that the Munich data supported Goldschmidt's theory of homosexuality as intersexuality.

Lang's work was criticized within the year from a psychotheapeutic perspective. Professor J.H. Schultz, from Berlin, praised Lang's statistical approach and even urged other psychotherapists to become 'inseparable allies' with race hygiene researchers who could compile more data than a single psychotherapist could in a lifetime of treatment (Schultz 1937, 578). Schultz was not convinced, however, that Lang had fully explained the origins of homosexuality. Schultz argued that families with 'evil' mothers and 'kind' fathers tended to be one type of family that produced homosexual men. Brothers coming from such a family would, according to Schultz, share a tendency toward homosexuality (Schultz 1937, 576). These and other psychological factors were offered as reasonable causes for homosexuality that would produce the kinds of family patterns that Lang had uncovered in his analysis of the Munich police records.

In the same issue of the *Zeitschrift für die gesamte Neurologie und Psychiatrie* that held Schultz's critique, Lang published his response. In addition to 151 new probands which supported his statistical

¹⁰ Lang always studied male homosexuals. For a contemporary critique of the Family Studies approach to the genetics of homosexuality see McGuire 1995.

argument, Lang attempted to dismiss Schultz's claims by minimizing their relevance. Lang's case for a genetic basis for homosexuality rested on analysis of the probands' siblings. In cases where the proband was an only child, Schultz could claim that there was no basis for preferring one kind of explanation over another. To bolster his analysis, Lang broke down his data by family size and by degree of relatedness of siblings (full or half-sibling). Because only around 10% of the families studied had a single child, Lang argued that Schultz had not identified a significant weakness (Lang 1937, 566). When he analyzed half-sisters and half-brothers, Lang found the same pattern although not at the same level of statistical significance. This led Lang to conclude that his genetic explanation was better supported by his data.

By the end of 1937, Lang's inability to obtain enough information on female homosexuals and their families created methodological difficulties which he had to address. Lang's methodological concern was that always using probands of one sex would skew the sex ratio which was the crucial measure in his studies (Lang 1938a, 804). Using ten different sets of data largely from his colleagues in the Munich Institute, Lang demonstrated that having exclusively male or female probands did not significantly skew the sex ratio from its normal proportion. This meant that the effect Lang measured in his studies of homosexuals and their families was not an artifact of his method. In mounting this defense, Lang also had the opportunity to demonstrate how powerful the proband methods were for analyzing psychiatric traits. His brief review of the literature made it clear that many different researchers had successfully applied the same methods to a range of significant psychiatric disorders (Lang 1938a).

From 1938 to 1941, Lang continued to pursue his research on the genetics of homosexuality. In 1938, he expanded his data base using police records from Hamburg. Combined with his earlier data from Munich, the Hamburg cases yielded a sex ratio of 121.1:100; thereby continuing to support Goldschmidt's theory (Lang 1938b). In 1939, Lang added even more data from the Hamburg police records. (See Table 1 for a summary). Lang divided his probands into those older than 25 and those younger than 25 at their age of registration with the police. The older group was assumed to be less influenced by environmental factors, while the younger group had 'many more cases of homosexuality induced predominantly by environmental factors, such as education in boarding schools or other instances of life in a restricted society of the same sex' (Lang 1940b, 58). The sex ratio in the older group was always higher than in the younger group.

Proband	Age of Last Police Registr.	No. of Probands	Total No.	Male	Female	Sex Ratio (to 100 females)	Simple Standard Error for Sex Ratio
Munich Cases	Under 25	349	1,109	587	522	112.4	± 6.8
	Over 25	302	1,132	624	508	122.8	± 7.3
	Total	651	2,241	1,211	1,030	117.6	± 5.0
Hamburg Cases	Under 25	167	356	191	165	115.7	± 12.3
	Over 25	197	569	332	237	140.1	± 11.9
	Total	364	925	523	402	130.1	± 8.6
Total	Under 25	516	1,465	778	687	113.2	± 5.9
	Over 25	499	1,701	956	745	128.3	± 6.3
	Total	1,015	3,166	1,734	1,432	121.1	± 4.3

Table 1 -- Theo Lang's Data on Sex Distribution Among the Siblings of Homosexual Subjects. After 'Table V. -- Sex Distribution Among the Proband-Siblings' (Lang 1940, 61).

Growing confident in his results, Lang concluded that he had shown that most cases of homosexuality were genetically based. This research, he claimed, not only clarified the genetic origins of homosexuality, it allowed one to derive fundamental ideas about human genetic mechanisms (Lang 1939a, 270). Instead of claiming that he had supported Goldschmidt's theory of homosexuality as intersexuality, Lang now claimed to support Goldschmidt's valence theory concerning the strength and balance of sex factors. This shift was important because the idea of valences or strengths allowed Goldschmidt and Lang to explain variation in intersexuality. The issue of variability had arisen for Lang because his sample of probands included twins. When both twins were not homosexuals, Lang's genetic analysis had to delve into the details of Goldschmidt's time law and balance theory of sex determination to explain the phenotypic differences. This brought Lang back to the question of the relative importance of genetics and hormonal action that had caused Goldschmidt to abandon his genetic theory (Lang 1939c, 250). To try to settle this issue, Lang proposed the possibility of microscopic research to find cytogenetic confirmation of sexual inversion as well as more research on twins. Both of these areas would become increasingly important.

In 1939, Lang also began to speak out about the legal and social implications of his research. In an article for the *Monatsschrift für Kriminalbiologie und Strafrechtsreform*, Lang reviewed his research and its support for Goldschmidt's theory of homosexuality as

intersexuality. But, he then asked his readers not to misunderstand what followed from his conclusions. While homosexuality may have had a genetic basis, Lang argued that 'taking steps to protect the underaged from homosexuals is obviously not up for discussion' (Lang 1939b, 411). He admitted that from a legal, religious, and medical perspective, strict legislation and even sterilization may seem like the best course of action, but from a race hygiene perspective strict punishments for homosexuality would 'disturb the natural eradication process'. Lang thought that the threat of punishment would cause homosexuals to hide their tendencies by marrying and having children. The result would be children of lower quality (Lang 1939b, 412). Lang reiterated this same argument in 1941, saying that sharp sanctions against homosexuality may actually produce more homosexuality in the next generation (Lang 1941b, 168).

In the midst of his research on homosexuality Lang became embroiled in a serious dispute with Ernst Rüdin over his place in the Psychiatric Institute. On December 20, 1939, Lang was asked by Rüdin to never enter the *Deutsche Forschungsanstalt für Psychiatrie* again.¹¹ A few days before, Lang and Rüdin had met in the institute to settle some evidently long-standing differences (see also Weber 1993, 245). As a Senior Assistant, Lang thought that he had control over payment of his research expenses. Rüdin did not agree. The dispute that erupted drew in the institute's managerial staff while questioning Rüdin's authority and both Rüdin's and Lang's financial propriety.¹² The dispute quickly involved authorities within the *Kaiser-Wilhelm-Gesellschaft* and the medical community. Lang charged that Rüdin's management of the institute was 'prejudicial and antisocial'.¹³ Rüdin replied that evidence pointed to the opposite – that Lang was in fact antisocial and quarrelsome. In his eleven page response, Rüdin systematically laid out a case against Lang. In an especially telling passage, Rüdin denounced Lang politically, arguing that while Lang had earlier defended National Socialism from its enemies, more recently he had resigned his Party membership and was relying on his earlier service to the Party and his scientific zeal to allow officials to turn a blind eye to his political change.¹⁴ Lang's problems with Rüdin

¹¹ E. Rüdin to T. Lang, December 20, 1939, pp. 212g. Beschwerde Dr. Lang, Personalangelegenheiten, I.1A.s.

¹² E. Rüdin to Dr. Heuss, January 3, 1940, pp. 214-214d. Beschwerde Dr. Lang, Personalangelegenheiten, I.1A.2457, Archiv zur Geschichte der Max-Planck-Gesellschaft, Berlin-Dahlem.

¹³ T. Lang to Dr. Heuss, January 2, 1940, p. 215a. Beschwerde Dr. Lang, Personalangelegenheiten, I.1A.2457, Archiv zur Geschichte der Max-Planck-Gesellschaft, Berlin-Dahlem.

¹⁴ E. Rüdin, 'Beantwortung des Schreibens des Herrn Dr. Lang von 12.1.1940 an Herrn Dr. Telschow,' January 25, 1940, p. 10. Beschwerde Dr. Lang, Personalangelegenheiten, I.1A.2457, Archiv zur Geschichte der Max-Planck-Gesellschaft, Berlin-Dahlem

also correspond to the take over of the institute by the SS. In 1939, Rüdin had asked for support from the SS and in exchange they placed *Oberführer* Professor Wüst on the board of directors and funded three assistants. Wüst and the assistants lobbied against Rüdin and older members of his staff, but their attitude toward Lang is less clear (Weindling 1989, 538; Weber 1996, 329).

As Lang's dispute with Rüdin continued through the winter and spring of 1940, it became clear that he was not going to be allowed back into the institute. As a result Lang began to campaign to have the funding he had received transferred to him and to have possession of the homosexuality data base that he had collected. He also revived a proposal to the *Kaiser-Wilhelm-Gesellschaft* and the *Deutsche Forschungsanstalt für Psychiatrie* to found a new psychiatric institute in Munich which focused on physical factors which contribute to mental disorders. Drawing on his research on feeble-mindedness and cretinism, he emphasized the role that environmental factors such as radiation, the air and water have on mental illnesses.¹⁵ The proposal was turned down in part because of Lang's conflict with Rüdin, but on May 31, 1940 the Board of Directors for the Psychiatric Institute met and, at the suggestion of Director Schultz of the *Bayerischen Innenministerium*, Lang's work on feeble-mindedness and cretinism was funded for two years. Justified as an opportunity to complete his work, Lang would work in a local hospital but his funding would be administered through the *Kaiser-Wilhelm-Gesellschaft*.¹⁶ Because most of the research was focused on homosexuality, Lang lobbied, with limited success, to get this work funded.

Throughout this period of turmoil, Lang continued to publish on homosexuality and acknowledged support from the *Deutschen Forschungsgemeinschaft*, the *Kaiser-Wilhelm-Gesellschaft*, and an unnamed Bavarian business (Lang 1940a-b; 1941a-c). In fact, Lang received funding for his research on homosexuality in 1941 (5,660 RM) and in 1943 (2,200RM) (Schoppmann 1991, 134).¹⁷ While some of these publications extended his work by adding more data from the Hamburg police files (Lang 1940a), others summarized his findings for new audiences (Lang 1940b; 1941c). In one paper he reported on work begun earlier on the relationship between

¹⁵ T. Lang to Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften, May 10, 1940, pp. 1-2. Beschwerde Dr. Lang, Personalangelegenheiten, I.1A.2457, Archiv zur Geschichte der Max-Planck-Gesellschaft, Berlin-Dahlem.

¹⁶ 'Aktennotiz,' May 31, 1940. Beschwerde Dr. Lang, Personalangelegenheiten, I.1A.2457, Archiv zur Geschichte der Max-Planck-Gesellschaft, Berlin-Dahlem.

¹⁷ 'Lang, Dr. med. Th.', RFR Kartei, Reichsforschungsrat, A 3345-DS/REM B119, Berlin Document Center.

homosexuality and psychosis. This paper connected Lang's research to that done by Rüdin prior to the SS take-over, but while it was numbered as the first in a series, no further papers in the series were ever published (Lang 1941b).

In 1941, Lang's work was both extended and criticized by researchers in Leipzig. Klaus Jensch from the University of Leipzig used police records from Breslau, Leipzig, and Sachsen to create a data base of over 2,000 probands (Jensch 1941a; 1941b; Schoppman 1991, 135). Like Lang, Jensch found a significant bias in the sex ratio, although it was not as large as the bias found in Lang's data. A more pointed critique came from Paul Schröder, an emeritus Professor from the University of Leipzig, who objected to Lang's genetically based theory, its presumed link between homosexuality and intersexuality, and its apparent tolerant consequences for the prosecution of homosexuals (Schröder 1940, 1941; Jellonnek 1993, 223). Lang defended his approach and its value given the ubiquity of homosexuality. As he had earlier, Lang reiterated that strong criminal prosecution of homosexuals would force them into hiding and result in the spread of genetic homosexuals rather than their 'eradication' (Lang 1941b, 168).

In 1940, Lang's work also came under review at the request of the SS. With Lang's statistical method called into question, *Oberfeldarzt* Otto Wuth reported that Lang's hypothesis remained unconfirmed. His recommendation was for further research to clarify the question (Schoppmann 1991, 136; Koller 1942). However, where Lang called for lighter criminal prosecution, Wuth argued that if homosexuality was genetic, then that was all the more reason that they should be punished and put into custody (Schoppmann 1991, 162). Lang was not called upon to undertake further research and in December of 1941 he left Germany for Switzerland to continue his research on cretinism.

Once in Switzerland, Lang passed information on the medical killings of patients in psychiatric hospitals to the English secret service. The notes that formed the basis of his January 2, 1942 interview named a number of officials and gave specific information about hospitals, procedures, and the numbers of patients killed. In these notes, no mention of Lang's own work is made. Later, on May 10, 1945, Lang wrote to the Interallied Commission for the Investigation of War Crimes denouncing Rüdin as experimenting with x-ray sterilization in collusion with the SS-appointed assistants to his institute.¹⁸ While Lang's denunciation of Rüdin may have

¹⁸ 'Report on Sterilization in Germany and Occupied Countries', U.S. Nuremberg War Crimes Trials, M887, 17, Frames 663-8, RG 238, War Crimes Record Collection, National Archives, Bethesda, MD.

been motivated in part by his earlier altercation and dismissal, Lang also claims that, in January of 1941, he approached Dr. Herman Göring, Director of the German Institute for Psychotherapy in Berlin, and tried to get him involved in 'starting a counteraction'. According to Lang, Göring refused to sign a statement opposing medical killings, although he told Lang in conversation that he opposed them. In 1945, Lang also criticized German racial research for putting politics above science (Lang 1945), but the timing of these statements, as well as his earlier position on the 'natural eradication' of homosexuals, should make Lang's 'resistance' to Nazi medical killing more ambiguous than some scholars believe (Lifton 1986, 87; Wertham 1969, 178; see also Müller-Hill 1988, 183).

After 1945, Lang worked as the head physician at the Cantonal Lunatic Asylum in Herisau, Switzerland. Despite his absence from a research institute, from 1945 to 1960, Lang continued to publish on the genetic basis of homosexuality and his work was widely discussed (Lang 1945; 1952; 1960). Like his earlier publications, these articles promoted Goldschmidt's theory of homosexuality as intersexuality and used both Lang's and Jensch's statistical data to make the case.

On the basis of Lang's data, Franz Kallmann initiated his study of the genetics of homosexuality using twins (Kallmann 1952; Allen 1996). Kallmann had been a researcher at Rüdin's institute until, as a Jew, he was forced to leave. As a researcher at Columbia University, Kallmann had brought Rüdin's methods to the United States and had completed his influential research on schizophrenia (Allen 1996). Following Lang's suggestion of further twin research, Kallmann noted that English researcher Roy Darke had called Lang's results into question with his own survey of cases (Kallmann 1952, 286; Darke 1948). Darke's sample of 100 probands produced a ratio of 122.4:100 for probands under age 26, but the result was not statistically significant. Similarly, Kallmann's study of 85 twin probands produced a ratio of 125.3:100, but was also not statistically significant. Kallmann recognized the ambiguity of his work and, like Lang, realized that the 'conclusive test' for the theory of homosexuality as intersexuality would come from cytogenetic tests of homosexuals. If Goldschmidt's theory was correct, male homosexuals should not have a Y chromosome (Kallman 1952, 286).

In the late 1950s, chromosomal sexing became possible using Barr bodies, which appear in female cells as a characteristic spot but do not appear in male cells at all (Rainer 1976). Using Barr bodies as a guide to chromosomal sex, C.M.B. Parc sought to cytologically test Lang's claims. Examining the cell preparations from 50 homosexual

men, Pare found that the incidence of Barr bodies was almost identical to that observed in a male control group (Pare 1956; Pare 1965). Moreover, in the four years after Pare's 1956 paper, other researchers confirmed his results in 235 cases (Pare 1965). For Pare, this constituted strong evidence against Lang's defense of Goldschmidt's theory. Lang, however, was not one to give up without a fight and, in 1960, published his last defense of Goldschmidt's theory. Although much of this article is a review of his earlier work, Lang tries to cast doubt on the reliability of using Barr bodies as a guide to chromosomal sex. Indeed he questions whether presence or absence of a sex chromosome is a reliable way to address a genetic theory based on the balance of sex factors of different strengths (Lang 1960). Appealing to unknown autosomal sex determining genes, however, overextended Goldschmidt's theory and Lang's ability to extend it. Despite his last protest, the cytological evidence marked the true end of Goldschmidt's theory of homosexuality as intersexuality.

Conclusion

Regardless of any reservations Goldschmidt may have had, Theo Lang approached his research on homosexuality with zeal. Driven in part by his political aspirations, Lang's selection of homosexuality as a problem for genetic research was part of a deliberate effort to win a high place in the National Socialist hierarchy. Other problems such as schizophrenia, alcoholism, feeble-mindedness, *etc.* were available and had important eugenic ramifications, but Lang chose homosexuality.

Why did Lang maintain an association of his research with Goldschmidt's theory of homosexuality as intersexuality, especially when he knew that Goldschmidt had disassociated himself from this view? Goldschmidt's theory clearly offered Lang a genetic basis for homosexuality. Moreover, by framing his work as a Goldschmidtian project, Lang effectively engaged not only a prominent biologist from Munich, and a prominent body of knowledge, but a type of understanding of sex and sexuality needed to make his work appear more comprehensive and biological.

Lang was not a geneticist. He was a medical researcher specializing in statistical analysis of psychiatric disorders. The adoption of Rüdin's method of empirical heredity prognosis placed Lang in a psychiatric research tradition which emphasized a statistical approach to genetics. In contrast, Goldschmidt was a zoologist with a broad understanding of biology. He sought unified and comprehensive knowledge of the

mechanisms of sex determination, which he articulated in the time law of intersexuality. This fundamental law was meant to cover cases of sex determination and intersexuality from moths to men. Maintaining an association with Goldschmidt's theory allowed Lang to cross boundaries between biological research on sex determination and medical research in psychiatry and to claim a more comprehensive understanding of homosexuality than he could with genealogical and demographic methods alone.

While Lang put his research on a more comprehensive foundation by maintaining an association to Goldschmidt's conceptual framework, his methodology and values as a researcher allowed him to overlook Goldschmidt's objections to his own theory. While to Goldschmidt, in 1931, human homosexuality represented a breakdown in his unified theory of intersexuality, to Lang it represented an opportunity for statistical analysis. Lang's allegiances were not to a biologically comprehensive theory of homosexuality, but to a method of research that gave psychiatric disorders a physical basis in genetics or the environment. This method and Lang's social views concerning racial hygiene supported each other well, even if in the end they were not politically effective for Lang.

While Goldschmidt's theory of homosexuality as intersexuality was finally put to rest once the chromosomal sex of homosexuals could easily be determined, biological and genetic explanations for homosexuality have been making a comeback in recent years (Hamer and Copeland 1994). The ease with which Lang adopted Goldschmidt's theory during the Nazi period and Lang's own stance of the 'natural process of eradication' for homosexuals should, however, give pause to those who see a biological basis for homosexuality as entailing pro-homosexual social politics. While we are not in danger of Nazi-style eugenics making a resurgence in popularity, Evelyn Fox Keller and other commentators have noted that the 'eugenics of normalcy' can have profoundly conservative social and political implications (Keller 1992; Halley 1994). Then, as now, biological theories often showed great adaptability to different social, cultural, and political contexts. Biology, in these situations, is not an arbiter of different political positions, but is politics by other means.

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References

- Allen G., 1974, 'Opposition to the Mendelian-Chromosome Theory: The Physiological and Developmental Genetics of Richard Goldschmidt', *Journal of the History of Biology*, 7: 49-92.
- Allen G., 1980, 'The Historical Development of the "Time Law of Intersexuality" and Its Philosophical Implications'. In: Piternick L. (ed.), *Richard Goldschmidt: Controversial Geneticist and Creative Biologist, Experientia Supplementum*, 35: 41-48.
- Allen G., 1996, 'The Double-Edged Sword of Genetic Determinism: Social and Political Agendas in Genetic Studies of Homosexuality, 1940-1994'. In: Rosario V. (ed.), *Science and Homosexualities*, New York: Routledge.
- Burleigh M., Wiperman W., 1991, *The Racial State: Germany 1933-1945*, Cambridge: Cambridge University Press.
- Bush G., 1982, 'Goldschmidt's Follies', *Paleobiology*, 8: 463-469.
- Clarke A., 1998, *Disciplining Reproduction: Modernity, American Life Sciences, and "the Problems of Sex"*, Berkeley: University of California Press.
- Darke R., 1948, 'Heredity as an Etiological Factor in Homosexuality', *Journal of Nervous and Mental Disease*, 107: 251-268.
- Dietrich M., 1995, 'Richard Goldschmidt's "Heresies" and the Evolutionary Synthesis', *Journal of the History of Biology*, 28: 431-461.
- Dietrich M., 1996, 'On the Mutability of Genes and Geneticists: The "Americanization" of Richard Goldschmidt and Victor Jollos', *Perspectives on Science*, 4: 321-345.
- Dietrich M., 2000, 'From Gene to Genetic Hierarchy: Richard Goldschmidt and the Problem of the Gene'. In: Beurton P., Falk R., Rheinberger H. (eds), *The Concept of the Gene in Development and Evolution: Historical and Epistemological Perspectives*, Cambridge: Cambridge University Press, 91-114.
- Fout J., 1992, 'Sexual Politics in Wilhelmine Germany: The Male Gender Crisis, Moral Purity, and Homophobia'. In: Fout J. (ed.), *Forbidden History: The State, Society, and the Regulation of Sexuality in Modern Europe*, Chicago: University of Chicago Press, 259-292.

- Jensch K., 1941a, 'Zur Genealogie der Homosexualität', *Archiv für Psychiatrie und Nervenkrankheiten*, 112: 527-540.
- Jensch K., 1941b, 'Weiterer Beitrag zur Genealogie der Homosexualität', *Archiv für Psychiatrie und Nervenkrankheiten*, 112: 679.
- Kallman F., 1952, 'Comparative Twin Study on the Genetic Aspects of Male Homosexuality', *The Journal of Nervous and Mental Disease*, 115: 283-298.
- Keller E.F., 1992, 'Nature, Nurture, and the Human Genome Project'. In: Kevles D., Hood L., (eds), *The Code of Codes*, Cambridge: Harvard University Press, 281-299.
- Kohler R., 1994, *Lords of the Fly: Drosophila Genetics and the Experimental Life*, Chicago: University of Chicago Press.
- Koller S., 1942, 'Über die Anwendbarkeit und Verbesserung der Probandenmethode. Schlusswort zu den Bemerkungen von Th. Lang', *Zeitschrift für Menschliche Vererbung*, 26: 444.
- Kraft-Ebing R., 1965, *Psychopathia Sexualis* (English edition), New York: Putnam's Sons.
- Lang T., 1930, 'Der Nationalsozialismus als politischer Ausdruck unserer biologischen Kenntnis', *Nationalsozialistische Monatshefte*, 9: 393-397.
- Lang T., 1932, 'Die Belastung des Judentums mit Geistig-Auffälligen', *Nationalsozialistische Monatshefte*, 24: 119-126.
- Lang T., 1936, 'Beitrag zur Frage nach der genetischen Bedingtheit der Homosexualität', *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 155: 702-713.
- Lang T., 1937, 'Weiterer Beitrag zur Frage nach der genetischen Bedingtheit der Homosexualität', *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 157: 557-574.
- Lang T., 1938a, 'Kurze methodologische Bemerkung zu meinen Arbeiten über die genetische Bedingtheit der Homosexualität', *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 160: 804-809.
- Lang T., 1938b, 'Ergebnisse einer siebten Messungsserie zur Frage des Zusammenhangs zwischen Radioaktivität und Kropf', *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 162: 72-88.
- Lang T., 1939a, 'Vierter Beitrag zur Frage nach der genetischen Bedingtheit der Homosexualität', *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 166: 255-270.
- Lang T., 1939b, 'Ergebnisse neuer Untersuchungen zum Problem der Homosexualität', *Monatsschrift für Kriminalbiologie und Strafrechtsreform*, 30: 401-413.
- Lang T., 1939c, 'Über die erbliche Bedingtheit der Homosexualität und die grundsätzliche Bedeutung der Intersexualitätsforschung für die menschliche Genetik', *Allgemeine Zeitschrift für Psychiatrie und ihre Grenzgebiete*, 112: 237-254.
- Lang T., 1940a, 'Fünfter Beitrag zur Frage nach der genetischen Bedingtheit der Homosexualität', *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 170: 663-671.
- Lang T., 1940b, 'Studies on the Genetic Determination of Homosexuality', *Journal of Nervous Disease*, 92: 370-381.
- Lang T., 1941a, 'Untersuchungen an männlichen Homosexuellen und deren Sippschaften mit besonderer Berücksichtigung der Frage des Zusammenhangs zwischen Homosexualität und Psychose. I. Teil. Die Probanden und deren engere Familie', *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 171: 651-679.

- Gilbert S., 1978, 'The Embryological Origins of the Gene Theory', *Journal of the History of Biology*, 11: 307-351.
- Goldschmidt R., 1911, 'Über die Vererbung der sekundären Geschlechtscharaktere', *Sitzungsberichte der Gesellschaft für Morphologie und Physiologie in München*, 27: 115-118.
- Goldschmidt R., 1912, 'Erblichkeitsstudien an Schmetterlingen I. 1. Untersuchungen über die Vererbungen der sekundären Geschlechtscharaktere und des Geschlechts', *Zeitschrift für induktive Abstammungs- und Vererbungslehre*, 8: 79-88.
- Goldschmidt R., 1916a, 'Experimental Intersexuality and the Sex Problem', *American Naturalist*, 50: 705-718.
- Goldschmidt R., 1916b, 'Die biologischen Grundlagen der konträren Sexualität und des Hermaphroditismus beim Menschen', *Archiv für Rassen und Gesellschafts Biologie*, 12: 1-14.
- Goldschmidt R., 1917, 'Intersexuality and the Endocrine Aspect of Sex', *Endocrinology*, 1: 433-456.
- Goldschmidt R., 1927, 'Die zygotischen sexuellen Zwischenstufen und die Theorie der Geschlechtsbestimmung', *Ergebnisse der Biologie*, 2: 554-684.
- Goldschmidt R., 1931, *Die sexuellen Zwischenstufen*, Berlin: J. Springer.
- Goldschmidt R., 1923, *The Mechanism and Physiology of Sex Determination*, Dakin W. (trans.), London: Methuen and Co.
- Goldschmidt R., 1960, *In and Out of the Ivory Tower*, Seattle: University of Washington Press.
- Gould S.J., 1980, 'The Hopeful Monster Revisited'. In: *The Panda's Thumb*, New York: W.W. Norton and Co., 186-193.
- Gould S.J., 1982, 'The Uses of Heresy: An Introduction to Richard Goldschmidt's *The Material Basis of Evolution*'. In: *The Material Basis of Evolution*, New Haven: Yale University Press, xiii-xlii.
- Halley J., 1994, 'Sexual Orientation and the Politics of Biology: A Critique of the Argument from Immutability', *Stanford Law Review*, 46: 503-568.
- Hamer D., Copeland P., 1994, *The Science of Desire: The Search for the Gay Gene and the Biology of Behavior*, New York: Touchstone.
- Hartman M., (ed.), 1936, *25 Jahre Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften. Zweiter Band. Die Naturwissenschaften*, Berlin: Springer Verlag.
- Harwood J., 1993, *Styles of Scientific Thought: The German Genetics Community, 1900-1933*, Chicago: University of Chicago Press.
- Herrn R., 1995, 'On the History of Biological Theories of Homosexuality'. In: De Cecco J., Parker D., (eds), *Sex, Cells, and Same Sex Attraction*, New York: Haworth Press, 31-56.
- Herzer M., 1992, *Magnus Hirschfeld: Leben und Werk eines jüdischen, schwulen und sozialistischen Sexologen*, Frankfurt: Campus.
- Hirschfeld M., 1903, 'Heredität und Homosexualität', *Jahrbuch für sexuelle Zwischenstufen*, 5: 138-159.
- Hirschfeld M., 1914, *Homosexualität des Mannes und Weibes*, Berlin: L. Marcus.
- Hodann M., 1917, 'Neue Forschungen zur Kenntnis der hereditär-physiologischen Grundlagen sexueller Zwischenstufen', *Jahrbuch für sexuelle Zwischenstufen*, 17: 59-68.
- Jellonnek B., 1993, 'Homosexuellenforschung im Dritten Reich'. In: Lautmann R., (ed.), *Homosexualität: Handbuch der Theorie- und Forschungsgeschichte*, Frankfurt: Campus Verlag, 221-225.

- Lang T., 1941b, 'Bemerkungen zu dem Aufsatz "Homosexualität" von Prof. Dr. med. Paul Schröder', *Monatsschrift für Kriminalbiologie und Strafrechtsreform*, 32: 162-168.
- Lang T., 1941c, 'Erbbiologische Untersuchungen über die Entstehung der Homosexualität', *Münchener Medizinische Wochenschrift*, 35: 961-965.
- Lang T., 1945, 'Zur Frage nach der genetischen Struktur von Homosexuellen und deren Eltern', *Archiv der Julius Klaus-Stiftung für Vererbungs-forschung, Anthropologie und Rassenhygiene*, 20: 51-76.
- Lang T., 1952, 'Zum Problem der Homosexualität', *Juristische Rundschau*, 7: 273-275.
- Lang T., 1960, 'Die Homosexualität als genetisches Problem', *Acta Genetica Medicae et Gemellologiae*, 9: 370-381.
- Lauritsen J., Thorstad D., 1974, *The Early Homosexual Rights Movement (1864-1935)*, New York: Times Change Press.
- Lifton R., 1986, *The Nazi Doctors*, New York: Basic Books.
- Littlefield C.L., Bryant P.J., 1980, 'Views on Sex Determination'. In: Pitenick L. (ed.), *Richard Goldschmidt: Controversial Geneticist and Creative Biologist*, Experientia Supplementum, 35: 49-63.
- Maienschein J., 1984, 'What Determines Sex?: A Study of Converging Approaches, 1880-1916', *Isis*, 75: 457-480.
- Mayr E., 1980, 'How I Became a Darwinian'. In: Mayr E., Provine W., (eds), *The Evolutionary Synthesis*, Cambridge: Harvard University Press.
- Mayr E., 1982, *The Growth of Biological Thought*, Cambridge: Harvard University Press.
- Mazumdar P., 1996, 'Two Models for Human Genetics: Blood Grouping and Psychiatry in Germany between the World Wars', *Bulletin of the History of Medicine*, 70: 609-657.
- McGuire T.R., 1995, 'Is Homosexuality Genetic? A Critical Review and Some Suggestions'. In: De Cecco J., Parker D. (eds), *Sex, Cells, and Same Sex Attraction*, New York: Haworth Press, 115-145.
- Moll A., 1891, *Konträre Sexualempfindung*, Berlin: Fischer.
- Müller-Hill B., 1988, *Murderous Science*, Oxford: Oxford University Press.
- Neugebauer F., 1908, *Hermaphroditismus beim Menschen*, Leipzig.
- Oosterhuis II., 1991, 'Homosexual Emancipation in Germany before 1933: Two Traditions', *Journal of Homosexuality*, 22: 1-27.
- Oudshoorn N., 1994, *Beyond the Natural Body: An Archeology of Sex Hormones*, New York, NY: Routledge.
- Pare C., 1956, 'Homosexuality and Chromosomal Sex', *Journal of Psychosomatic Research* 1: 247-251.
- Pare C., 1965, 'Etiology of Homosexuality: Genetic and Chromosomal Aspects'. In: Marmor J., (ed.), *Sexual Inversion: The Multiple Roots of Homosexuality*, New York: Basic Books, 70-80.
- Proctor R., 1988, *Racial Hygiene*, Cambridge: Harvard University Press.
- Raff R.A., Kaufmann T.C., 1983, *Embryos, Genes, and Evolution*, New York: Macmillan.
- Rainer J., 1976, 'Genetics and Homosexuality'. In: Kaplan A. (ed.), *Human Behavior Genetics*, Springfield: Charles C. Thomas Publisher, 301-316.
- Richmond M., 1986, *Richard Goldschmidt and Sex Determination: The Growth of German Genetics, 1900-1935*, unpublished Ph.D. dissertation, Indiana University.

- Schoppmann C., 1991, *Nationalsozialistische Sexualpolitik und weibliche Homosexualität*, Pfaffenweiler: Centaurus-Verlagsgesellschaft.
- Schröder P., 1940, 'Homosexualität', *Monatsschrift für Kriminalbiologie und Strafrechtsreform*, 31: 221-234.
- Schröder P., 1941, 'Nochmals Homosexualität', *Monatsschrift für Kriminalbiologie und Strafrechtsreform*, 32: 168-171.
- Schultz J.H., 1937, 'Bemerkungen zu der Arbeit von Theo Lang über die genetische Bedingtheit der Homosexualität', *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 157: 575-578.
- Sengoopta C., 1992, 'Science, Sexuality, and Gender in the *Fin-de-Siècle*: Otto Weininger as Baedeker', *History of Science*, 30: 249-279.
- Sengoopta C., 1998, 'Glandular Politics: Experimental Biology, Clinical Medicine, and Homosexual Emancipation in *Fin-de-Siècle* Central Europe', *Isis*, 89: 445-473.
- Steakley J., 1975, *The Homosexual Emancipation Movement in Germany*, New York: Arno Press.
- Steakley J., 1992, 'Iconography of a Scandal: Political Cartoons and the Eulenberg Affair'. In: Dynes W., Donaldson S. (eds), *History of Homosexuality in Europe and America*, New York: Garland Publishing, 323-385.
- Steakley J., 1997, 'Per scientiam ad justitiam: Magnus Hirschfeld and the Sexual Politics of Innate Homosexuality'. In: De Cecco J., Parker D. (eds), *Sex, Cells, and Same Sex Attraction*, New York: Haworth Press, 133-154.
- Steinach E., 1916, 'Pubertätsdrüsen und Zwitterbildung', *Archiv für Entwicklungsdynamik*, 42: 307-332.
- Von Frisch K., 1967, *A Biologist Remembers*, New York: Pergamon Press.
- Wallace B., 1985, 'Reflections on the Still "Hopeful Monster"', *The Quarterly Review of Biology*, 60: 38.
- Weber M., 1993, *Ernst Rüdin: Eine kritische Biographie*, Berlin: Springer.
- Weber M., 1996, 'Ernst Rüdin, 1874-1952: A German Psychiatrist and Geneticist', *American Journal of Medical Genetics*, 67: 323-331.
- Weindling P., 1989, *Health, Race and German Politics Between National Unification and Nazism, 1870-1945*, Cambridge: Cambridge University Press.
- Weingart P., Kroll J., Bayertz K., 1988, *Rasse, Blut, und Gene: Geschichte der Eugenik und Rassenhygiene in Deutschland*, Frankfurt: Suhrkamp Verlag.
- Wertham F., 1969, *A Sign for Cain*, New York: Open Court.
- Wolff C., 1986, *Magnus Hirschfeld*, London: Quartet Books.
- Wolff K., 1922, *Beitrag zur Kenntnis der Genetik einer menschlichen Intersexualitätsstufe ('Homosexualität')*, Inaugural-Dissertation zur Erlangen der medizinischen Doktorwürde an der Friedrich-Wilhelm-Universität zu Berlin.
- Wright S., 1976, Transcript of Oral History of Sewall Wright collected by William Provine. March 1, 1976, Part 1, p. 3. Sewall Wright Papers, American Philosophical Society Archives, Philadelphia, PA.