THE PROBLEMATIC SCIENCE

PSYCHOLOGY IN NINETEENTH-CENTURY THOUGHT

Edited by

William R. Woodward

and

Mitchell G. Ash

PRAEGER

PRAEGER SPECIAL STUDIES • PRAEGER SCIENTIFIC

NEW YORK, 1982

8

Freud and Biology: The Hidden Legacy

Frank J. Sulloway

In 1924 Karl Abraham acquired a copy of one of Sigmund Freud's earliest scientific publications, which had appeared in 1878 and had dealt with the neuroanatomy of *Petromyzon planeri*, a primitive form of fish.[1] Upon hearing this, Freud responded with the following comment: "It is making severe demands on the unity of the personality to try and make me identify myself with the author of the paper on the spinal ganglia of the petromyzon. Nevertheless I must be he, and I think I was happier about that discovery than about others since."[2] What exactly does the neuroanatomy of petromyzon have to do with psychoanalysis? Much more than one might think, especially if we focus on the author of that paper rather than on the paper itself.

It is my contention that Freud, through the years, has become a crypto-, or covert, biologist, and that psychoanalysis has become,

---

Previous versions of this paper were delivered at the Convengo su Psicoanalisi e Storia delle Scienze, Gabinetto Scientifico Letterario G. P. Vieusseux, Florence, June 29, 1980; the History of Science Society Annual Meeting, Toronto, October 17, 1980; and the Meet-the-Author Session of the American Psychoanalytic Association Annual Meeting, San Juan, Puerto Rico, May 8, 1981. I am especially grateful to Nathan G. Hale, Jr. and Robert R. Holt for their critical comments on this paper.

accordingly, a crypto-biology.[3] This contention, which builds upon a minority voice in Freud scholarship, really involves two main arguments. The first is that Freud, who began his scientific career as a biologist, always remained committed to biological reductionism, and, indeed, that his most creative inspirations derived in significant part from biology.[4] In saying this, I do not mean to imply that psychoanalysis is nothing but biology masquerading as psychology. Rather, it is a sophisticated psychobiology, the biological sources of which have never been adequately appreciated.[5]

This interpretation of Freud and psychoanalysis runs directly counter to a complex myth that both Freud and his followers have sought to propagate—a mythology that pictures Freud as the lonely "psychoanalytic hero" who, all by himself and against a universally hostile outside world, "invented" a totally original psychology through analysis of his patients and (heroically) of himself. This brings me to my second main contention, namely, that psychoanalysis has cultivated a highly functional collection of myths about its own origins. The purpose of these myths has been to legitimate psychoanalysis as a "pure psychology" (Ernest Jones's phrase)—a psychology supposedly developed by Freud's remarkable intellect in a manner that is, above all, neatly in accordance with psychoanalytic theory itself.[6] The entire history of psychoanalysis has therefore been constructed by folding psychoanalytic theory back upon itself and upon the mind of the intellectual hero who originated it. In other words, traditional psychoanalytic history has become a circular history par excellence.

In making these claims, it is not my intention to judge or condemn the fascinating process by which the Freud legend arose. I seek merely to understand this process of mythification, to document it, and to clarify its role in the rise of the psychoanalytic movement.

FREUD'S SCIENTIFIC RELATIONSHIP WITH WILHELM FLIESS

No figure has been victimized by as many myths and misconceptions in the service of the psychoanalytic cause as has Wilhelm Fliess (1858–1928), the Berlin physician and biologist, whose friendship with Freud spanned the fifteen crucial years from 1887 to 1902 in which psychoanalysis took form (Figure 8-1). Moreover, in many important respects Freud's much-misunderstood relationship with

Figure 8–1. Sigmund Freud and Wilhelm Fliess (*right*) in the summer of 1890. (Courtesy of Sigmund Freud Copyrights, Ltd.)

Fliess illustrates, in microcosm, the crypto-biological character of Freud's thought system as a whole.

According to Ernest Jones, Ernst Kris, and other psychoanalyst-historians, Fliess was a baneful pseudoscientist whom Freud tolerated as a "listener" owing to his scientific isolation and rejection during the 1890s. "Whatever help . . . Fliess gave to Freud," Jones has commented, "it must have been essentially that of psychological encouragement; the purely intellectual assistance could only have been minimal. . . . So the talks were duologues rather than dialogues."[7] In particular, Fliess is said to have functioned as a crucial

transference figure during Freud's heroic self-analysis in the fall of 1897. The self-analysis, in turn, is said to have led to Freud's revolutionary discovery of infantile sexuality, an insight that finally invalidated his previous "seduction" theory of neurosis and simultaneously freed him of his need for biology and Fliess.[8]

What Freud's biographers, including Jones, do not seem to have known, however, is that Fliess was a pioneer in the field of infantile sexuality. His own ideas on this subject appeared in an 1897 monograph nine months before Freud began a systematic self-analysis. Fliess was led to this subject through his interest in three ideas—ideas that seem bizarre and misguided in historical hindsight, but that nevertheless enjoyed considerable scientific respect in Fliess's day. The first of these notions, which he published at the urging of Freud, posited an intimate connection between the nose and the female genitalia, a connection that Fleiss documented in the 1890s by pointing to such clinical phenomena as vicarious nosebleeding during pregnancy and swelling of the turbinate bone during menstruation.[9] Fliess's second principal idea was that all human beings are bisexual —possessing chemical substances (what today would be called hormones) common to the opposite sex as well as their own. This second idea was in turn linked to Fliess's third scientific preoccupation, namely, his belief that all life is regulated by two rhythms, a 23-day male cycle and a 28-day female cycle.

Although all three of Fliess's theories were subject to considerable debate around the turn of the century, these theories were also considered scientifically plausible by many of Fliess's colleagues— Freud included. To appreciate the acceptance these ideas enjoyed, one must understand the implicit evolutionary context in which they seemed to make intuitive sense to those of Freud's generation.

The relations between the nose and the female genital organs had a long prehistory of medical research prior to Fliess's interest in this subject. In America, John Noland Mackenzie anticipated many of Fliess's ideas in an 1884 paper in which he cited most of the same clinical phenomena as did Fliess a decade later. Mackenzie attributed these pathogenic phenomena to "the [phylogenetic] connecting link between the sense of smell and erethism of the reproductive organs exhibited in the lower animals."[10] Indeed, the genitalia, the nipples, and the nose are the only parts of the body to possess erectile tissue; and all three parts, as Mackenzie pointed out, become simultaneously erect during sexual arousal. This is why some people suffer from chronic nasal disturbance such as sneezing during sexual intercourse.

In the 1890s, Mackenzie's and Fliess's views enjoyed increasing recognition and were endorsed, for example, by Freud's eminent

Viennese colleague Richard von Krafft-Ebing in his famous *Psychopathia Sexualis*.[11] A few years later, Berlin sexologist Iwan Bloch also subscribed to Fliess's views, citing in this connection Ernst Haeckel's related theory that "erotic chemotropisms" (smell in the wider sense) were the "primal source" of all sexual attraction in nature.[12] Freud was personally familiar with this evolutionary logic, and he even scored Iwan Bloch's discussion of Haeckel's primal-smell theory in his own copy of Bloch's book.[13] As one pro-Fliessian summed it all up in 1914, "All this petty quibbling [about Fliess's findings] can change nothing. The relationship between the nose and the genitalia is one that is founded deep in the history of evolutionary development."[14]

The subject of vital periodicity also had an evolutionary rationale that has gone unmentioned by Freud's biographers. In 1871 Charles Darwin had discussed the whole subject at some length in *The Descent of Man*. He personally attributed the weekly and monthly periodicities in many temporal aspects of vertebrate growth and reproduction to the descent of all higher vertebrates from a tidal-dependent marine organism similar to the present-day ascidians. The ascidian, or sea-squirt, is a potato-sized organism that was once thought to be a plant. But in 1866 the Russian embryologist Aleksandr Kovalevsky made the remarkable discovery that the embryonic stages of the ascidian possess a primitive notochord.[15] The ascidian was therefore hailed by Darwin and Haeckel as the missing link between vertebrates and invertebrates, a highly important piece of propaganda for evolutionary theory.

The ascidian, which lives in tidal zones, has its vital cycles regulated fortnightly by changes in the tides. Its food supply consequently undergoes changes week by week. On the basis of such facts, Darwin had inferred that some animal closely allied to the present-day ascidians must have been the original source of man's own periodic functions in gestation, growth, and disease; and these cycles, he argued, continue to betray man's "primordial birthplace" in the sea.[16]

Finally, the ascidian, like our remote vertebrate ancestors, is *bisexual*, Darwin emphasized. This line of reasoning subsequently gave rise to the dominant theory of homosexuality in the late 1890s, namely, that this condition was a simple reversion, or developmental arrest, approximating an ancestral state.[17] The relationship between bisexuality, homosexuality, and arrested libidinal development was in turn crucial to Sigmund Freud's whole theory of psychosexual development, and it was Fliess who first brought this line of thought to Freud's attention in the 1890s.[18]

In short, the Darwinian and evolutionary context of Fleiss's ideas on nose and sex, vital periodicity, and human bisexuality made them seem far more plausible to Freud and his contemporaries than psychoanalytic historians have led us to believe. Man, said Charles Darwin in *The Descent of Man* (1871), was descended from a bisexual, lunar-cycle-dependent, tidal organism whose libido, said Ernst Haeckel in his *Anthropogenie* (1874), was originally triggered by chemotropisms (or smell in the wider sense). Seen in this evolutionary context, Fliess's ideas appeared to many to occupy the visionary forefront, not the lunatic fringe, of "hard" science. By 1913, when the Medical Society for Sexual Science was founded in Berlin, partly to help gain recognition for Fliess, there were some individuals, like Albert Eulenburg, the eminent neurologist, ardent Fliessian, and first president of that society, who thought that Freudian psychoanalysis, not Fliessian sexual biology, was the real pseudoscience of the two great medical "systems" of the day.[19]

What concerns me here, however, is not the popularity Fliess's theories enjoyed around the turn of the century, but rather the influence they exerted on Freud. Although all three of Fliess's scientific preoccupations had a lasting impact upon the fundamental conceptions of Freudian theory, Fliess's theory of vital periodicity was perhaps the most fruitful because it implied the necessary existence of spontaneous infantile sexuality—one of Freud's two most famous discoveries, the other being the meaning of dreams. According to Fliess, the mother's two periods (the 23- and 28-day cycles) were transmitted to the child in earliest embryonic life and were supposed to determine the sex of the offspring and to regulate its further maturation and vital activities until its death. It was to show that his two periodic rhythms were biochemically *sexual* in nature that Fliess was drawn to the problem of infantile sexuality. Fliess's periodicity theory, in contrast to prevailing scientific belief, posited that sexuality begins with conception and intrauterine life, not with puberty. Birth itself was supposed to be triggered by the tenth menstrual cycle (hence the average gestation period in man, Fliess argued, of 270–80 days).[20] And so it was that Fliess seized eagerly upon the little-recognized evidence for spontaneous infantile sexuality, and particularly for the periodicity of its manifestations, as major corroboration of his overall system of ideas.

In his monograph of 1897 he boldly asserted his case and backed it up with considerable observational evidence. He claimed, for example, that little boys regularly experience erections on their periodic days "as early as the first months of life."[21] Fliess also insisted that the impulse to sensual sucking occurs on such days and

is merely a substitute for masturbation. He made similar claims about the sexual nature of the excretory functions. In fact, Fliess largely anticipated Freud's later views about infantile erotogenic zones and the polymorphously perverse nature of infantile sexuality. Remember, moreover, that Fliess's average infant was not just sexual; it was doubly so—bisexual (itself a potentially "perverse" condition). Finally, Fliess preceded Freud in believing that infantile sexual activity could lead to a childhood actual neurosis, as his monograph plainly shows in the case history of little Fritz, aged $3\frac{3}{4}$.[22]

Thus, when Sigmund Freud later claimed to have discovered infantile sexuality, listing that as one of "the most unexpected" findings of his psychoanalytic researches, he was in fact reiterating one of Wilhelm Fliess's equally pioneering insights.[23] What Freud discovered during his famous self-analysis, a year after Fliess's monograph had appeared, was not infantile sexuality per se, but rather a largely personal—that is, autobiographical—confirmation of Fliess's prior findings.

Freud did not just adopt infantile sexuality from Fliess, however. He adopted much more, in particular the *biological* framework of that discovery, including the periodic and chemical aspects of the process. Not only did Freud accept the periodic, Fliessian nature of childhood sexual development, as can be seen in several passages of the *Three Essays on the Theory of Sexuality* (1905), but he also endorsed Fliess's biomedical extension of this conception to include the periodic nature of childhood anxiety neurosis. In *The Interpretation of Dreams* (1900), for example, Freud wrote about attacks of anxiety in childhood: "Investigation would probably show a periodicity in the occurrence of the attacks since an increase in sexual libido can be brought about not only by accidental exciting impressions but also by successive waves [*schubweise*] of spontaneous developmental processes."[24]

Schub ("push," "shove," or "thrust") and *schubweise* ("by thrusts") were the terms used by Wilhelm Fliess to describe the periodic ebb and flow of all developmental processes. Freud, who adopted these terms from Fliess, meant them to be understood in the Fliessian sense of *thrust*, the technical meaning they have in physics. These terms, used throughout Freud's own writings on infantile sexuality, have been consistently mistranslated into English (for example, *Entwicklungsschübe* as "progressive steps of development"—Freud actually meant "thrusts of development"—and *Schübe* as "steps," when Freud actually meant Fliessian "thrusts").[25] Freud also had Fliess's laws in mind when he spoke of *Verdrängungsschübe*

—"thrusts of repression." Freud made this particularly clear in 1913 when he suggested that the key to childhood fixations might lie in Fliess's laws of "*Entwicklungsschübe.*"[26]

This *thrust*like aspect of human development was one that Freud and Fliess had jointly sought to corroborate in the mid-1890s by collecting relevant data from their various patients, relatives, spouses, and children. In fact, Fliess even got Freud into the act of testing his periodic laws on the intrauterine phase of human development. Fliess's first child (Robert), who served as the guinea pig in many of Fliess's observations on infantile sexuality, and Freud's sixth and last child (Anna) were born in the same month (December 1895). Just how far Freud's scientific cooperation with Fliess's researches proceeded may be gathered from the following anonymous, but surely Freudian, observation subsequently attributed to "a friendly colleague" by Fliess, who cited his anonymous friend "word for word":

> My wife (VI para [delivery]) felt the first movements of the child on July 10th [1895]. On the 3rd of December came the beginning of labor and birth. On the 29th day of February her period resumed again. My wife has always been regular since puberty. Her period runs somewhat over 29 days. Now, from the 3rd of December to the 29th February exactly $88 = 3 \times 29\frac{1}{3}$ days elapsed and from the 10th of July to the 3rd of December $146 = 5 \times 29\frac{1}{5}$ days passed. For a period of somewhat over 29 days the birth therefore ensued right on time and the first movements of the child fall on the 5th menstrual date.[27]

That these observations were made by Sigmund Freud and dealt with his wife and youngest child Anna is corroborated by the date of birth—Anna Freud was indeed born on 3 December 1895—and by the birth order of the child—Anna was indeed Frau Freud's sixth delivery. Moreover, Fliess later used birth information on all the Freud children, as well as those of Freud's sister, in his larger book *Der Ablauf des Lebens* (Figure 8-2).[28] Such, then, was the nature of the Fliessian periodicity that, according to Ernst Kris, contributed nothing to the creation of psycho-analysis and supposedly lay at the very "periphery" of Freud's scientific interests.[29]

Fliess's ideas about infantile sexuality influenced Freud not only in the general manner I have just reviewed, but also in a series of other specific ways that encompassed the Freudian notions of sexual latency, sublimation, reaction formation, critical stages in childhood sexual development, and even Freud's theory of repres-

Zwölftes Beispiel.

Frau Marie Freuds Kinder

Grete	4. August	1887	476 = I
Lili	22. November	1888	1456 = II.
Martha	17. November	1892	

$$I = 476 = 17 \cdot 28$$
$$II = 1456 = 52 \cdot 28$$
$$I + II = 1932 = 69 \cdot 28 = 3 \cdot 23 \cdot 28.$$

Figure 8-2. Fliess's biorhythmic calculations concerning the temporal intervals separating the birth dates of the three children of Marie Freud (Freud's sister). The second child was born 17·28 days after the first, and the third child was born 52·28 days after the second. Finally, the interval between the first and the third child (I + II) is an even multiple of 23·28. (From Fliess, *Der Ablauf*, p. 51.)

sion. In saying this, I do not mean to impugn Freud's originality, for he extended and transformed all of these Fliessian notions in creative and fruitful ways. But Freud's creativity does not diminish Fliess's importance in this transformation of ideas. I have documented these various influences and intellectual transformations elsewhere,[30] and I shall explore only one aspect of them here, namely, those associated with Freud's general theory of oral, anal, and genital stages in childhood sexual development.

THE BIOGENETIC CONTEXT OF FREUD'S THEORIES

Fliess's theories commanded Freud's respect not only in an evolutionary context but also in a *biogenetic* one. According to the "fundamental biogenetic law" advanced by Ernst Haeckel and other late-nineteenth-century thinkers, "ontogeny recapitulates phylogeny": that is to say, in man, the development from fetus to adulthood (ontogeny) is a brief recapitulation of the entire history of the race (phylogeny).[31] (See Figure 8-3.) Freud's endorsement of this law constitutes perhaps the least appreciated source of a priori biological influence in all of psychoanalytic theory. For if the developing

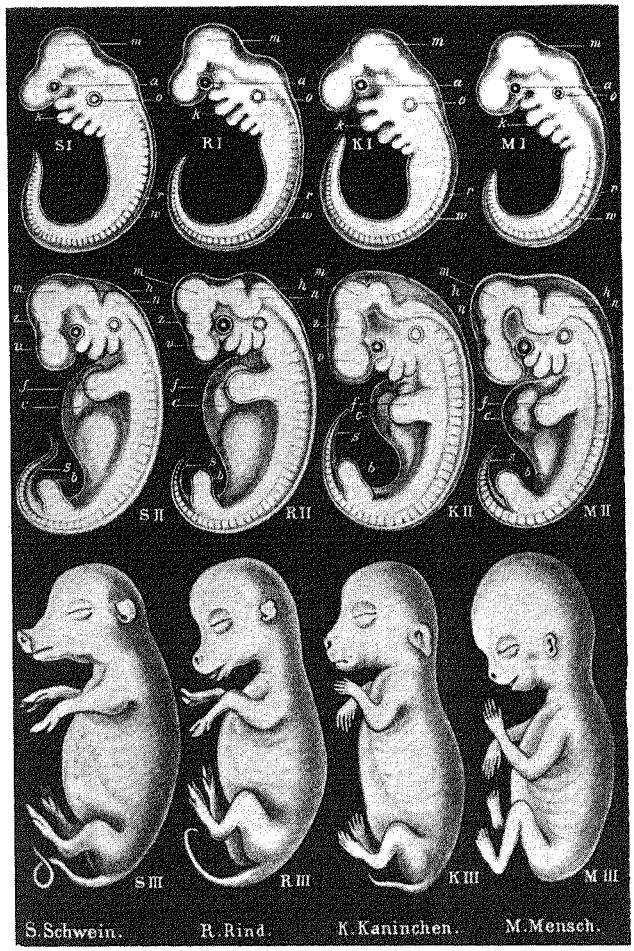

Figure 8–3. Ernst Haeckel's famous illustration of the biogenetic law. *Left to right*: embryos of the pig, cow, rabbit, and human as they supposedly recapitulate their common ancestry. (From *Anthropogenie*, Plate 7.) Haeckel, in accordance with an erroneous acceptance of the theory of the inheritance of acquired characteristics, believed that adult stages become modified by experience and that these modifications are then inherited and recapitulated at increasingly earlier stages in the descendants. In other words, ontogeny was thought to be a sort of memory for phylogeny, the experiences of which become condensed and abbreviated by ontogenetic repetition. In currently accepted Darwinian theory, there is no such recapitulation in the Haeckelian sense. Embryos are not miniature versions of ancestral *adults* but merely embryos. They resemble one another more closely than adults simply because natural selection has acted far more intensely upon the adult stages during the course of evolution, causing these later stages, but not the embryos, to diverge.

child recapitulates the history of the race, it must likewise recapitulate the *sexual* history of the race. This was one reason why Freud was so enthusiastic about applying Fliess's periodic laws to childhood sexual development, since sexuality in our remote ancestors was presumably far more periodic than it is today.[32] The child is therefore destined to repeat these periodic processes.

The biogenetic law was also the primary reason why oral and anal zones were such basic sources of infantile sexual excitation in Freudian theory. Viewed in terms of this law, the prepubertal human being must have the innate potential to reexperience all of the archaic forms of sexual pleasure that once characterized the mature life stages of our remote ancestors. According to Ernst Haeckel and his popularizer Wilhelm Bölsche, sexuality evolved from a primeval saclike organism, the gastraea, which was the original form of all multicellular life.[33] The first stage of sexuality was oral—eating, the incorporation of one gastraea by another. Gradually, as the gastraea evolved a gastrointestinal tract, the sexual organs became associated with the cloaca, as in the crocodiles. Finally, true genitalia emerged —the genital phase.

Not only did this phylogenetic logic underlie Freud's earliest (December 6, 1896) insights into the "extended" and "polymorphously perverse" nature of infantile sexual activity,[34] but it also gave him, in later years, his most irrefutable justification for these views. Here is what he had to say on this key point in his *Introductory Lectures on Psycho-Analysis*:

> In forming our judgement of the two courses of [instinctual] development—both of the ego and of the libido—we must lay emphasis on a consideration which has not often hitherto been taken into account. For both of them are at bottom heritages, abbreviated recapitulations, of the development which all mankind has passed through from its primaeval days over long periods of time. In the case of the development of the libido, this *phylogenetic* origin is, I venture to think, immediately obvious. Consider how in one class of animals the genital apparatus is brought into the closest relation to the mouth, while in another it cannot be distinguished from the excretory apparatus, and in yet others it is linked to the motor organs—all of which you will find attractively set out in W. Bölsche's valuable book.[35] Among animals one can find, so to speak in petrified form, every species of perversion of the [human] sexual organization.[36]

Freud elaborated upon this recapitulatory logic when he repeatedly maintained in other writings that each major substage in the child's

"pregenital" phase of sexual development has preserved a specific legacy of this phylogenetic influence.[37]

It is likewise no accident that Karl Abraham, the disciple who contributed the most to the psychoanalytic theory of libidinal stages, was himself a former embryologist.[38] Quick to endorse Freud's general biogenetic statements, Abraham referred to the ontogenetic half of this doctrine when he emphasized that the human anus is developed from the primitive blastopore mouth.[39] His astute propaganda for the theory of infantile sexuality did not go unnoticed by Freud, who cited Abraham's observation in the next edition of the *Three Essays on the Theory of Sexuality*.[40]

Thus, what many critics of psychoanalytic theory have considered an arbitrary equation of *sensual* with *sexual* in early childhood experience was not so at all to Freud. Biogenetically, Freud, as well as many of his contemporaries, perceived no other choice in the matter. How far from the truth, then, is the myth that Freud's biogenetic speculations were merely "late" and "peripheral" adjuncts to his serious psychoanalytic researches.[41] These biogenetic assumptions were absolutely crucial to his whole theory of psychosexual development and were also responsible for many of its most serious defects. It was the biogenetic law, for example, that gave Freud's developmental theories their supposedly universal character and allowed him to argue that a child need not be breast-fed to pass through the oral stage, or threatened with castration to experience a castration complex. In his writings on this subject he repeatedly stressed that "the phylogenetic foundation has . . . the upper hand," providing these phases with their regularity, their independence from culture, and their frequently terrifying and traumatic force.[42] Thus when Fritz Wittels, in his 1924 biography of Freud, ridiculed the idea that every child is threatened with castration, Freud confidently replied in the margin of his copy "*und die Phylogenese*?" ("and what of phylogeny?")[43]

FIXATION, REGRESSION, AND ORGANIC REPRESSION

Freud's biogenetic conception of sexual development lent itself to three additional notions that are also derived in significant part from Darwinian theory. I am referring to Freud's theories of fixation, regression, and organic repression, all developed in the late 1890s.

According to the theory of fixation, the various component instincts of the libido can become arrested at any stage of development prior to reaching their final goal—that is, genital satisfaction with a member of the opposite sex. Such preliminary stages are necessarily perverse and phylogenetically archaic, since they involve modes of sexual functioning other than genital pleasure.

The earliest mention of the idea of fixations (or developmental arrests) is not in Freud's psychoanalytic writings but rather in his neuroanatomical ones. In his researches on petromyzon, published in the late 1870s, Freud showed that certain large ganglion cells had apparently been arrested in their evolutionary migration from the spinal chord to the periphery (Figure 8-4). Freud concluded that "it is not surprising if, in an animal that in many respects represents a permanent embryo, there are cells that have remained behind and that indicate the path the spinal ganglion cells once traveled."[44] To use Freud's later psychoanalytic terminology, such laggard cells were "fixated" in the midst of their evolutionary course.

Years later, Freud cited the case of petromyzon in his *Introductory Lectures on Psycho-Analysis* as a biological analogy to the theory of libidinal fixations.[45] But the doctrine of developmental arrests was no mere "analogy." Freud had continued to use it in his work on cerebral paralyses in the 1880s and 1890s,[46] and he subsequently transferred it from that neurological application to the domain of human sexual development.

Regression, the notion that disease involves a reversal of normal developmental processes, is closely allied to the concept of fixation in Freud's theory. Neurotics become ill, according to Freud, either through a complete fixation of the libido or through a partial fixation followed by a subsequent regression to the point of libidinal fixation. Freud adopted the theory of regression (dissolution) from John Hughlings Jackson, who in turn borrowed it from the evolutionary philosophy of Herbert Spencer. The theory of regression enjoyed widespread use in the late nineteenth century among those psychologists influenced by evolutionary theory.[47]

As Freud began to make his biogenetic beliefs more explicit in his published writings after 1910, the notion of a regressive tendency became even more crucial to his psychoanalytic system of thought. If the biogenetic law, as Freud thought, relentlessly compels the child to recapitulate the forward progress of the race, it becomes difficult to account for neurosis (which is the outcome of regressions to prior points of fixation) without positing a counterbalancing *force* of regression. For without such a counterbalancing

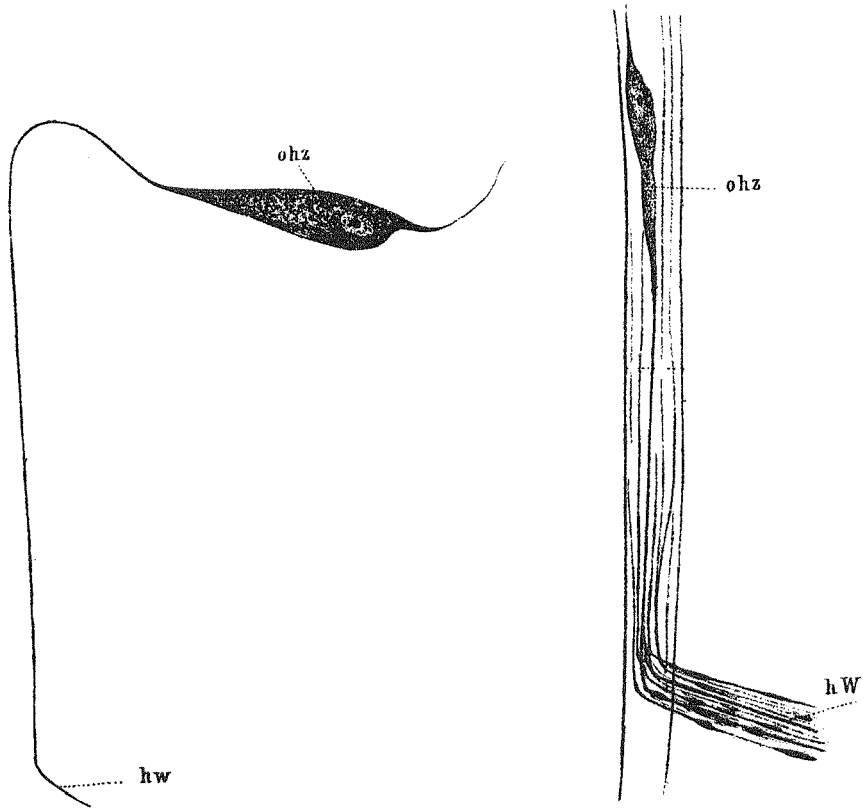

Figure 8–4. A transitional cellular element (*ohz*) between the central canal and the posterior nerve root (*hW*) of petromyzon. *Left*: the cell in isolation. *Right*: the cell *in situ*. Intermediate in form between large unipolar cells near the central canal and the bipolar ganglia of the periphery, this cell appears to mark the evolutionary path of ganglion cell migration toward the periphery. (From Freud, "Über Spinalganglien des Petromyzon," Plate 3, Figures 3 and 4.)

force, everyone would eventually reach psychological normality, and neurosis would be only a passing phase of development. In *Beyond the Pleasure Principle* (1920), Freud indeed concluded that just such a regressive force must exist. Following out the inexorable logic of this idea, he termed this regressive tendency a "death" instinct, since its ultimate outcome, if allowed to operate unrestrained, would be a condition of nonlife, the stage prior to life. Freud con-

trasted this death instinct with the biogenetically progressive force inherent in the "life" instincts, and he reasoned that their joint operation governs both normal mental life and regression to neurosis. Freud's enigmatic notion of a death instinct is therefore the logical culmination of his biogenetic conception of human psycho sexual development.

Freud's notion of organic repression, which encompasses his later theory of primal repression, dates from Freud's speculations in the Fliess correspondence about man's adoption of upright posture. Freud believed that the sense of smell, so important in mammalian sexuality, had given way to the visual sense in human sexual evolution when man become bipedal. As a result, smells formerly pleasurable to man (such as excremental and sexual odors) were repudiated and became a victim of reaction formation and organic repression.[48] The child, Freud believed, is forced to recapitulate this attitude toward excremental odors. The anal stage and its repression are accordingly innate.[49] In later years, Freud expanded this theory to encompass the whole subject of primal repressions, which determine the course of normal and abnormal development. "Man's archaic heritage," he explained in 1919, "forms the nucleus of the unconscious mind; and whatever part of that heritage has to be left behind in the advance to later phases of development . . . falls a victim to the process of [organic] repression."[50] Susceptibility to neurosis, Freud concluded, is the price man must pay for this phylogenetic advancement.

It is possible, in short, to trace many of the most basic psychoanalytic concepts to Freud's prior thinking along biological lines. Included among these psychobiological aspects of Freudian theory are the notion of infantile sexuality, particularly its polymorphously perverse and periodic (*schubweise*) nature; the theory of erotogenic zones; sexual latency; sublimation; reaction formation; critical stages in psychosexual development; and the theories of fixation, regression, the death instinct, and organic repression. It is possible to document, moreover, many other such ties to biology, including those that led Freud to his theories of dreaming, religion, and the origins of civilization.[51] But why, if this is so, did Freud tend to deny these ties to biological theory in his later years? True, he never ceased believing that biology was "a land of unlimited possibilities."[52] But why did he also state, to cite a characteristic remark, that "We have found it necessary to hold aloof from biological considerations during our psychoanalytic work and to refrain from using them for heuristic purposes. . . ."?[53] In historical retrospect, this and other

similar disclaimers about possible biological influences in psychoanalysis reveal a considerable ambivalence on Freud's part.

RIVALRY, REDUCTIONISM, AND THE EMERGENCE OF AN INDEPENDENT SCIENCE

The gradual emergence of Freud's ambivalence toward biology was the product of several mutually reinforcing influences. First, Freud tended to equate biological reductionism with neurophysiological reductionism, something that he had indeed largely abandoned as a premature quest in the 1890s, just as he had earlier rejected the even more crude attempts of his contemporaries to localize certain brain functions and nervous disorders within specific areas of the brain. In this connection, there can be little doubt that Freud was personally quite sincere in his belief that a general *psychological* theory, freed from the uncertain trappings of a poorly understood neurophysiology, was the goal to which psychoanalysis should aspire in his own lifetime. Similarly, Freud's findings increasingly led him to reject the prevailing medical doctrine of hereditary degeneration. He therefore saw psychoanalysis, in contrast to the contemporary neurophysiological doctrines he had spurned, as a distinctly psychological and environmentalist science of the mind. Additionally, his new therapeutic methods tended to give special visibility to these psychological aspects of his theories, and it was through this largely psychological level of discourse that psychoanalysis achieved much of its subsequent popularity. But Freud's theories, in contrast to his methods of therapy, were hardly any less biological after 1900 than before, since he had increasingly replaced one form of biological reductionism (neurophysiology) with another more promising one (evolutionary theory) during the late 1890s. Freud was apparently unaware, however, of just how biological his thinking had really remained. In this connection, the influence of Darwinism in late-nineteenth-century medical psychology was so widespread as to be almost invisible to many of those, including Freud, who incorporated evolutionary ideas into their thinking. But Freud's deemphasis of the biological roots of psychoanalysis encompassed more than just his own incomplete awareness of Darwinian and other biological influences. It is Freud's *ambivalence* toward biology that requires explaining, and one must look still further for the full reasons behind this growing ambivalence.

Freud's estrangement from Fliess provides an especially important key to understanding Freud's dramatic reversal in attitude toward biology after 1900. According to the traditional psychoanalytic account of the estrangement, Freud's self-analysis finally freed him of his neurotic need for Fliess and thereby allowed him to recognize his friend for the pseudoscientist he really was.[54] This traditional explanation is patently absurd, since Freud continued to believe in Fliess's theories long after the estrangement was complete.[55] Indeed, Freud never abandoned his belief that human development is regulated by a biological periodicity or that Wilhelm Fliess had documented two such vital periods. Freud objected only to Fliess's later use of complicated multiplications, additions, and subtractions in order to account for irregular temporal sums and hence to Fliess's disregard for environmental influences as a source of exceptions to his periodicity theory. The real explanation for their estrangement lies in the increasing rivalry that marked their cooperative attempts at biological reductionism.

In the 1890s, Freud had looked to Fliess to provide him with the biological underpinnings of his psychoanalytic findings, a task that Fliess more than amply fulfilled. By 1899, however, Fliess felt entitled to claim a certain share in Freud's theoretical formulations and to be given credit where credit was due. He also had been extending his own work in psychoanalytic directions, and he felt that Freud should reciprocate by formally acknowledging a place in psychoanalysis for the theories of bisexuality and periodicity. The issue therefore arose as to whose scientific domain was really the more important in their collaborative work; and Freud, anxious to preserve the independence of psychoanalysis, increasingly shied away from Fliess's attempts to unify the two approaches. Fliess naturally felt slighted by this attitude. The estrangement came to a head at their Achensee "congress' in 1900 when Freud flatly refused to acknowledge the applicability of Fliess's periodic laws to the course of recovery achieved during psychoanalytic therapy.[56] Simultaneously, Freud suffered a severe case of amnesia about Fliess's priority in applying bisexuality to the psyche when he suddenly claimed this insight at Achensee as his own discovery.[57] Fliess, convinced that Freud was trying to steal his ideas, decided to withdraw from their relationship. Freud, however, had no desire to end such a valuable association, and he desperately tried to win Fliess back with the announcement that he was going to write a book called "Bisexuality in Man," for which he would need Fliess's considerable help! Freud even offered to let Fliess coauthor the book, which was later published

in 1905 as the *Three Essays on the Theory of Sexuality*. Fliess flatly refused this offer, and so the relationship finally came to an end in 1902.

Or almost to an end; for subsequently there was an unfortunate priority dispute involving Freud, Fliess, and the philosopher Otto Weininger. In 1900 Freud had unwittingly been the instrument by which Fliess's theory of bisexuality had found its way to Weininger through one of Freud's students, Hermann Swoboda. Weininger had actually come to Freud in 1902 with a manuscript, in which Fliess's purloined theory of psychical bisexuality played a prominent role. The manuscript, entitled *Geschlecht und Charackter*, immediately became a bestseller when it was published in 1903.[58] In it, Weininger had foolishly claimed the notion of bisexuality in the psyche as his own discovery; and Freud, knowing Weininger's true source for the idea, had failed to correct the situation. Fliess, who was naturally anxious to establish his priority over Weininger, subsequently published portions of his correspondence with Freud in which Freud had admitted to an unconscious desire to rob Fliess of his originality.[59] Freud was outraged; and, in partial retaliation, he deleted one of his three acknowledgments of Fliess's scientific influence from the later editions of the *Three Essays on the Theory of Sexuality*.

The emotional scar left by the estrangement was a deep one. Above all, the estrangement was what prompted Freud to begin reevaluating the proper relationship between biology and psychoanalysis. Biological theory, as he had painfully learned from the Fliess episode, was a double-edged sword. In the 1890s, Freud had used it with great success to provide the foundations for a complex and highly sophisticated psychobiology of mind. But there was no guarantee that his followers, in the future, would choose to emphasize the same biological assumptions and therefore the same psychobiological consequences. Indeed, the rise of the psychoanalytic movement was punctuated by the same sorts of reductionistic and biological disagreements that had characterized Freud's estrangement from Fliess. Various followers began to stress different biological suppositions, and they were soon developing rival theories that proved incompatible with Freud's own. Stekel, Adler, and Sadger, for example, all sought to apply Wilhelm Fliess's theories of bisexuality and periodicity to various psychological problems. Freud strenuously opposed these efforts. To Karl Abraham he wrote in 1914: "The subjection of our psycho-analysis to a Fliessian sexual biology would be no less a disaster than its subjection to any system of ethics, metaphysics, or anything of the sort. . . . We must at all costs remain

independent and maintain our equal rights. Ultimately we shall be able to come together with all the parallel sciences."[60]

When Alfred Adler, drawing upon the theory of bisexuality, developed his novel ideas about inferiority feelings and the masculine protest, Freud responded bluntly at the Vienna Psychoanalytic Society:

> . . . one faces his [Adler's] expositions with a certain feeling of alienation, because Adler subjects the psychological material too soon to biological points of view, thus arriving at conclusions that are not yet warranted by the psychological material.
>
> . . . The example of Fliess, who offers a biological characterization [of the neuroses], has misled many.[61]

"Adler is a little Fliess come to life again," Freud declared to Ferenczi in 1910. "And his appendage Stekel is at least called Wilhelm."[62]

In the case of Carl Jung, the principal source of disagreement with Freud was Jung's variant interpretation of libidinal evolution. Jung believed that portions of the libido had become desexualized in the course of phylogeny and were now the basis for many nonsexual aspects of neurotic symptomology. Jung also rejected Freud's doctrines of infantile sexuality and sexual latency on biological grounds. "Such a process of development," Jung argued, "would be biologically unique. In conformity with this theory we would have to assume, for instance, that when a plant forms a bud from which a blossom begins to unfold, the blossom is taken back again before it is fully developed, and is again hidden within the bud, to reappear later on in a similar form."[63] Jung flatly dismissed this biological scheme as an "impossible supposition."

It is in the context of these defections over the biological assumptions of his own and other's theories that Freud increasingly came to see himself as a pure psychologist. It was his rivals, Freud claimed, not himself, whose theories were unfortunately tainted by excessive and unwarranted biological points of view.[64] Knowing that his innovative and far-reaching paradigm of mind needed considerable time to be tested, Freud actively sought to limit his remaining followers to the safer domain of pure psychology. Once, when prompted to define his attitude toward the organic approach to mental illness that Adler and Stekel had termed *organ language*, Freud unhesitatingly replied: "I had to restrain the analysts from investigations of this kind for educational reasons. Innervations,

enlargements of blood vessels, and nervous paths would have been too dangerous a temptation for them. They had to learn to limit themselves to psychological ways of thought."[65] "It was they," John Burnham similarly comments about Freud's followers, "who particularly . . . saw in his [Freud's] writings the 'purely psychological' level of discourse. Those born later than Freud were more at ease than he with [psychological] 'fictions' . . . , that is, hypothetical models. . . ."[66] Moreover, a strictly psychological conception of the origins of psychoanalysis allowed Freud's followers to envision his outmoded Lamarckian and biogenetic assumptions as "late" and "peripheral" additions to his theoretical repertoire. Freud was generally seen as having been spurred on in this respect by the more speculative tendencies of Ferenczi and Jung, who became convenient scapegoats for explaining Freud's own endorsement of these biological principles.[67]

In addition, a strictly psychological account of the origins of psychoanalysis constituted a strictly empirical account, one emphasizing the clinical basis of Freud's discoveries at the expense of the theoretical preconceptions that gave these clinical findings much of their meaning. An empiricist conception of Freud's discoveries was also highly consonant with Freud's own positivist leanings. Further enhancing this positivist conception of history was the Baconian self-image revolutionary movements in science typically seek to cultivate in the face of vehement opposition.[68]

Greatly reinforcing this psychological perspective on psychoanalytic history was the whole process of psychoanalytic education that Freud and his movement soon developed. To the average psychoanalyst, who was increasingly taught his discipline through a training analysis involving an enormous commitment of time and expense, it became difficult to imagine that Freud might have learned much of his own science somewhat differently, that is, in the physiological laboratory and from books and ideas that were to a large extent psychobiological. Compared with later psychoanalysts, Freud's intellectual development was unique, and much of that uniqueness has remained little appreciated by psychoanalysts. Who, for example, among psychoanalysts today ever reads Freud's still-untranslated works in neuroanatomy and neurophysiology or studies in detail his pre-1900 publications? Indeed, the whole tenor of traditional psychoanalytic history has been to write about the past in such a manner that it appears to lead up to, and to confirm, the *present* conception of the "psychoanalytic experience." This tendency, termed "Whiggish history" by Herbert Butterfield, has

greatly enhanced the psychological and clinical perspectives that psychoanalysts have developed about their own history. But it has also provided a powerful obstacle to reconstructing the history of psychoanalysis as it really happened.[69]

BIOLOGY AND THE FREUD LEGEND

It is hardly surprising, then, that Freud's *own* biological assumptions eventually became crypto-biological ones, obscured by the increasingly elaborate psychoanalytic accounts that he and his biographers provided for the emergence of his ideas. Freud, for example, never once mentioned his personal debt to Wilhelm Fliess's pioneering researches on infantile sexuality. In fact, he repeatedly claimed that he himself had been the first to discover the sexual life of the child and that only *his* researches—particularly his invention of the psychoanalytic method—had made this discovery possible. "None, however, but physicians who practise psycho-analysis," he wrote in his *Three Essays on the Theory of Sexuality*, "can have any access whatever to this sphere of knowledge. If mankind had been able to learn from a direct observation of children, these three essays could have remained unwritten."[70]

Freud also failed to mention Fliess, even once, in his *Autobiography*. Until the Fliess correspondence was finally published in 1950, few analysts had any idea how close these two men had once been. Moreover, Fliess's theories had been thoroughly refuted in the meantime, so the discovery of his intimate personal association with Freud during the latter's years of great discovery was about as welcome as if a Velikovsky had turned out to be Albert Einstein's closest confidant during the development of relativity theory. This embarrassing situation was partly neutralized when the editors of the Fliess correspondence (Ernst Kris, Marie Bonaparte, and Anna Freud) omitted from publication most of those portions of Freud's letters in which he sought to relate his emerging theories to the scientific work of his friend Fliess.[71] After 1950, innumerable myths and misconceptions about Fliess were fostered by psychoanalyst-historians, especially Ernst Kris and Ernest Jones, in order to minimize Fliess's intellectual role in Freud's life. These misconceptions eventually allowed psychoanalytic history to be stood on its head, as with the following assertion by Marthe Robert: "It can be assumed . . .

that when Freud came to think that the links between his psychology and physiology and physics were looser than he had first believed —for instance, when he discovered infantile sexuality—Fliess had some difficulty in following him along a path so far removed from his own."[72] So Fliess—the incorrigible pseudoscientist—was apparently incapable of understanding infantile sexuality, the very subject he had been so instrumental in bringing to Freud's attention in the 1890s!

Elsewhere I have documented this process of mythification more extensively than I can do here.[73] But I would like briefly to delineate the way in which Freud's increasingly crypto-biological status as a thinker has nurtured the Freud legend. The more Freud and his psychoanalyst-biographers lost sight of Freud's manifold intellectual ties to Fliess, biology, Darwinism, and many other contemporary sources of inspiration, the more they required a convincing substitute history to explain how Freud had actually made his discoveries. The myth of the isolated hero, with its dramatic emphasis on Freud's self-analytic path to discovery, effectively supplied that substitute history.

Fritz Wittels first suggested in his 1924 biography of Freud that Freud's self-analysis must have been the source for his pioneering discovery of infantile sexuality.[74] Freud, despite his formal objections to many aspects of Wittel's book, acquiesced to this particular suggestion, although he never made such a claim himself. Over the succeeding years, the story of Freud's mysterious self-analysis became invested with many other aspects of intellectual discovery, until it seemed almost limitless in its powers of historical explanation. To the self-analysis were attributed Freud's abandonment of the seduction theory, his formulation of the Oedipus complex, the free association technique, the concepts of transference and resistance, and even Freud's discovery of the unconscious.[75] "Psychoanalysis proper," concludes one such spokesman for this traditional position, "is essentially a product of Freud's self-analysis."[76] Anything with no other apparent historical explanation was attributed to this "catch-all" event in Freud's life. Take, for example, Freud's puzzling abandonment of biological reductionism and the *Project for a Scientific Psychology* (1895) in favor of a pure psychology. No problem. The self-analysis, says Reuben Fine, precipitated "the decisive change in . . . [Freud's] interests from neurology to psychology, and created a whole new science, psychoanalysis."[77] In short, what may be characterized as "the myth of the hero" became a highly convincing alternative to Freud as a nineteenth-century psychobiologist.

FREUD'S ACHIEVEMENTS IN RETROSPECT

Where does this revisionist historical analysis leave Sigmund Freud? Acceptance of Freud's historical debt to biology requires a rather uncongenial conclusion for many psychoanalytic practitioners, namely, that Freud's theories reflect certain outmoded nineteenth-century biological assumptions, particularly those of a psychophysicalist, Lamarckian, and biogenetic nature. There can be little question that these faulty assumptions bolstered the heart of his developmental theories, inspired many of his most controversial psychoanalytic claims, and prevented Freud from accepting negative findings and alternative explanations for his views. So plausible were these assumptions in Freud's day that he was not always aware, even himself, of how much faith he placed in them or of how much his seemingly "empirical" observations were influenced by them. But plausible or not, such assumptions are nevertheless wrong; and much that is wrong with psychoanalytic theory, as Freud conceived it, may be traced directly back to them. To cite a prime example, dozens of systematic research studies have been unable to provide convincing corroboration for the theory that oral and anal stages of development are the *direct* sources of the various personality traits that Freud himself ascribed to these stages.[78] But if one is not wedded to Freud's biogenetic views, which dictated the close conceptual ties between abandoned erotogenic zones, reaction formation, organic repression, and character traits, it is possible to see why Freud's particular developmental explanation might prove problematical. Similar examples of psychoanalytic ideas having an unsound biological base might be cited from the theory of dreaming, Freud's binary conception of life and death instincts, and his views on culture and civilization.

Still what remains today of Freud's insights and influence is remarkable indeed and provided ample testimony to his greatness. What is more, a historical understanding of Freud's achievements in no way diminishes the man's genius, which has hitherto been shrouded in psychoanalytic legend.[79] Above all, Freud's writings may be said to contain a richness of thought and observation about human behavior that will continue to outlive the particular theoretical constructs he championed.[80] In Freud's own lifetime, amidst the storm of controversy over his psychoanalytic claims, Havelock Ellis summed up this timeless quality to Freud's insights: "But if . . . Freud sometimes selects a very thin thread [in tying together his theoretical arguments], he seldom fails to string pearls on it, and these have their value whether the thread snaps or not."[81]

As for the Freud legend, we must not be too harsh on those who created it. For psychoanalytic history is really no different from history in general, which customarily has its origins in myth. If myth has nevertheless continued to rule psychoanalytic history, this circumstance reflects not only the highly functional role myth has played in the psychoanalytic movement but also the indisputably heroic life Freud actually led. The Freud legend, then, is a natural outgrowth of Freud's intellectual greatness or, more precisely, of the countless intellectual battles and elaborate protective mechanisms that such greatness inevitably inspires.

NOTES

1. Sigmund Freud, "Über Spinalganglien und Rückenmark des Petromyzon," *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften [Wien]*, Mathematisch-Naturwissenschaftliche Classe 78, III. Abtheilung (1878): 81–167.

2. Sigmund Freud and Karl Abraham, *A Psycho-Analytic Dialogue: The Letters of Sigmund Freud and Karl Abraham 1907–1926* (New York: Basic Books; London: Hogarth Press and The Institute of Psycho-Analysis, 1965), p. 369.

3. Frank J. Sulloway, *Freud, Biologist of the Mind: Beyond the Psychoanalytic Legend* (New York: Basic Books; London: Burnett Books/André Deutsch, 1979).

4. The crucial issue of historiographical debate in Freud scholarship is not whether psychoanalysis partakes of biological points of view; that is undeniable and has never been contested. What is in dispute are the precise origins and implications of these biological points of view. In particular, the issue is whether Freud's theories were primarily derived *inductively* from clinical research and also led him, incidentally, to certain fundamental biological insights; or, instead, whether Freud made certain biological principles the original foundations of a psychology that was then largely and *deductively* derived from them. As early as 1930 Ernest Jones steadfastly insisted that psychoanalysis "does not . . . [involve] any deductive application of biological principles"—"Psychoanalysis and Biology," in *Proceedings of the Second International Congress for Sex Research, London 1930,* ed. A. W. Greenwood (Edinburgh and London: Oliver and Boyd, 1930), p. 604. Similarly, Jones later claimed that although Freud's researches contributed in important ways *to* biology (and not vice versa), these contributions were largely "incidental" to his main work in psychology. "Freud had thus in his purely psychological studies lighted on biological laws of the widest validity"—Jones, *The Life and Work of Sigmund Freud,* 3 vols. (New York: Basic Books, 1953–57), vol. 3, p. 305.—See also Freud's similar statement in his 1915 Preface to *Three Essays on the Theory of Sexuality* (1905), in *The Standard Edition of the Complete Psychological Works of Sigmund Freud,* 24 vols., ed. and trans. James Strachey (London: Hogarth Press

and The Institute of Psycho-Analysis, 1953–74), vol. 7, p. 131. This position has received widespread support from traditional Freud scholarship and has become the basis for various psychoanalytic reconstructions of Freud's discoveries (see notes 6, 7, 8, 43, 54, and 71). The alternative claim that Freud's thinking was influenced deductively, and often adversely, by biological assumptions was broached by various Neo-Freudians (for example, Karen Horney, Harry Stack Sullivan, and others), beginning in the late 1930s. More recently, this position has been given a historical foundation by the researches of a number of Freud scholars. The most important of these are Robert Holt, "A Review of Some of Freud's Biological Assumptions and Their Influence on His Theories," in *Psychoanalysis and Current Biological Thought*, ed. Norman S. Greenfield and William C. Lewis (Madison and Milwaukee: University of Wisconsin Press, 1965), pp. 93–124; "Beyond Vitalism and Mechanism: Freud's Concept of Psychic Energy," in *Historical Roots of Contemporary Psychology*, ed. Benjamin B. Wolman (New York: Harper & Row, 1968), pp. 196–226; Peter Amacher, *Freud's Neurological Education and Its Influence on Psychoanalytic Theory, Psychological Issues* 4, no. 4 (Monograph 16) (1965); and Karl H. Pribram and Merton M. Gill, *Freud's 'Project' Re-assessed: Preface to Contemporary Cognitive Theory and Neuropsychology* (New York: Basic Books; London: Hutchinson Publishing Group, 1976). This recent literature has emphasized Freud's continued commitment to neurophysiological reductionism. Although I agree in most respects with this position, I do not believe that it has focused on the most essential features of Freud's psychobiological synthesis. It is my contention, developed here and more fully in *Freud, Biologist of the Mind* (see note 3), that psychoanalysis arose when Freud, strongly influenced by the Darwinian biology of his times, substituted an evolutionary for a physiological model of the mind. For additional references to the extant literature on this subject, see *Freud, Biologist of the Mind*, pp. 13–17, 20, 119–20, 238 n., 439, 442, 495. On the historiographical inadequacies inherent in an *inductivist* versus a *deductivist* dichotomization of Freud's relationship to biology, see note 68.

5. I use the word *psychobiology* here to denote Freud's revolutionary synthesis of biology and psychology, together with his lifelong goal of uniting psychology with biology. The word is not used to denote a conception of the psyche as an essentially biological entity. Nor does it mean the study of psychology in its biological aspects alone (a more limited denotation of this term common in current scientific research). I have employed the word *cryptobiology* to denote a portion of Freud's thinking that has become obscured from historical view, not as a description of his motives in this process or as a description of psychoanalysis as a whole.

6. Jones, *Life and Work*, vol. 1, p. 395.

7. Ibid., p. 303; and Ernst Kris, Introduction to *The Origins of Psycho-Analysis, Letters to Wilhelm Fliess, Drafts and Notes: 1887–1902*, by Sigmund Freud (New York: Basic Books; London: Imago, 1954), p. 43.

8. Jones, *Life and Work*, vol. 1, p. 307; Kris, Introduction to *Origins*, pp. 33–35, 43–46; Reuben Fine, *The Development of Freud's Thought: From the Beginnings (1886–1900) through Id Psychology (1900–1914) to Ego Psychology (1914–1939)* (New York: Jason Aronson, 1973), pp. 218, 242; David Shakow and David Rapaport, *The Influence of Freud on American Psychology, Psychological Issues* 4, no. 1 (Monograph 13) (1964):44; and Giovanni Costigan, *Sigmund Freud: A Short Biography* (New York: Macmillan, 1965; London: Robert Hale, 1967), pp. 53–54, 60–61.

9. Wilhelm Fliess, *Neue Beiträge zur Klinik und Therapie der nasalen Reflexneurose* (Leipzig and Vienna: Franz Deuticke, 1893); "Magenschmerz und Dysmenorrhoe in einem neuen Zusammenhang," *Wiener klinische Rundschau* 9 (1895):4-6, 20-22, 37-39, 65-67, 115-17, 131-33, 150-52; and *Die Beziehungen zwischen Nase und weiblichen Geschlechtsorganen: In ihrer biologischen Bedeutung dargestellt* (Leipzig and Vienna: Franz Deuticke, 1897).

10. John Noland Mackenzie, "Irritation of the Sexual Apparatus as an Etiological Factor in the Production of Nasal Disease," *The American Journal of the Medical Sciences* n.s. 88 (1884):360-65; "The Physiological and Pathological Relations between the Nose and the Sexual Apparatus of Man," *The Journal of Laryngology, Rhinology, and Otology* 13 (1898):109-23.

11. Richard von Krafft-Ebing, *Psychopathia Sexualis, with Especial Reference to Antipathic Sexual Instinct: A Medico-Forensic Study*, 10th ed., trans. F. J. Rebman (London: Rebman, 1899), p. 34.

12. Iwan Bloch, *Beiträge zur Aetiologie der Psychopathia sexualis*, 2 vols. (Dresden: H. R. Dohrn, 1902-3), vol. 2, p. 201; Ernst Haeckel, *Anthropogenie oder Entwickelungsgeschichte des Menschen: Keimes- und Stammes-Geschichte* (Leipzig: Wilhelm Engelmann, 1874), pp. 656-57; see also Ernst Haeckel, *Anthropogenie oder Entwickelungsgeschichte des Menschen: Gemeinverständliche wissenschaftliche Vorträge*, 2 vols. 4th ed. (Leipzig: Wilhelm Engelmann, 1891), vol. 1, p. 147; vol. 2, p. 886, n. 195.

13. Freud Library, London. I am grateful to Anna Freud for permission to examine that portion of her father's personal library retained by him when he immigrated to London in 1938.

14. A. Siegmund, 20 March discussion of "Die Nase in ihren Beziehungen zu den Sexualorganen," a lecture delivered by Max Senator before the Ärzliche Gesellschaft für Sexualwissenschaft und Eugenik in Berlin on February 20, 1914, *Zeitschrift für Sexualwissenschaft* 1 (1914):77.

15. Aleksandr Kovalevsky, "Entwickelungsgeschichte der einfachen Ascidien," *Mémoires de l'Académie Impériale des Sciences de St.-Petersbourg*, 7th series 10, no. 15 (1866).

16. Charles Darwin, *The Descent of Man, and Selection in Relation to Sex*, 2 vols. (London: John Murray, 1871), vol. 1, p. 212 n.

17. Krafft-Ebing, *Psychopathia Sexualis*, pp. 332-33.

18. Freud, *Origins*, pp. 178, 220; *Three Essays*, p. 166.

19. Iwan Bloch, "Worte der Erinnerung an Albert Eulenburg," *Zeitschrift für Sexualwissenschaft* 4 (1917):243.

20. Fliess, *Beziehungen*, p. 47.

21. Ibid., p. 198.

22. Ibid., pp. 192-94.

23. Sigmund Freud, *An Outline of Psycho-Analysis* (1940), in *Standard Edition*, vol. 23, p. 153.

24. Sigmund Freud, *The Interpretation of Dreams* (1900), in *Standard Edition*, vol. 5, p. 585.

25. See, for example, Freud, *Origins*, p. 233.

26. Sigmund Freud, "The Disposition to Obsessional Neurosis: A Contribution to the Problem of the Choice of Neurosis" (1913), in *Standard Edition*, vol. 12, p. 318, n. 1.

27. Fliess, *Beziehungen*, p. 128.

28. Wilhelm Fliess, *Der Ablauf des Lebens: Grundlegung zur exakten Biologie* (Leipzig and Vienna: Franz Deuticke, 1906), pp. 51, 60.

29. Kris, Introduction to *Origins*, p. 43.

30. Sulloway, *Freud, Biologist of the Mind*, pp. 188-213, 235-37.

31. Ernst Haeckel, *Generelle Morphologie der Organismen: Allgemeine Grundzüge der organischen Formen-Wissenschaft, mechanisch begründet durch die von Charles Darwin reformirte Descendenztheorie*, 2 vols. (Berlin: Georg Reimer, 1866), vol. 2, p. 300; see also *Natürliche Schöpfungsgeschichte* (Berlin: Georg Reimer, 1868); and *Anthropogenie*. For a critical analysis, both historical and scientific, of the biogenetic law, see Stephen Jay Gould, *Ontogeny and Phylogeny* (Cambridge and London: Harvard University Press, Belknap Press, 1977).

32. Sigmund Freud, *Civilization and Its Discontents* (1930), in *Standard Edition*, vol. 21, p. 99.

33. Ernst Haeckel, "Die Gastrula und die Eifurchung der Thiere," *Jenische Zeitschrift für Naturwissenschaft* 9 (1875):402-508; Wilhelm Bölsche, *Das Liebesleben in der Natur: Eine Entwickelungsgeschichte der Liebe*, 3 vols. (Berling and Leipzig: Eugen Diederichs, 1898-1903).

34. Freud, *Origins*, pp. 180, 186-87, 231-32.

35. Freud is referring here to Bölsche's *Das Leibesleben* (see note 33).

36. Sigmund Freud, *Introductory Lectures on Psycho-Analysis* (1916-17), in *Standard Edition*, vols. 15-16, vol. 16, p. 354.

37. Sigmund Freud, *Three Essays*, p. 198; "From the History of an Infantile Neurosis" (1918), in *Standard Edition*, vol. 17, p. 108.

38. Karl Abraham, *Selected Papers*, with an Introductory Memoir by Ernest Jones, vol. 1: *Selected Papers on Psychoanalysis*, trans. Douglas Bryan and Alix Strachey (New York: Basic Books, 1953; London: Hogarth Press, 1954), pp. 10, 503.

39. Karl Abraham, *Versuch einer Entwicklungsgeschichte der Libido auf Grund der Psychoanalyse seelischer Störungen* (Leipzig, Vienna, Zurich: Internationaler Psychoanalytischer Verlag, 1924).

40. Freud, *Three Essays*, p. 199.

41. Jones, *Life and Work*, vol. 3, pp. 324, 329; Shakow and Rapaport, *The Influence of Freud*, p. 32, n. 37; Lucille B. Ritvo, "The Impact of Darwin on Freud," *The Psychoanalytic Quarterly* 43 (1974):187-89.

42. Freud, *An Outline*, pp. 188-89.

43. Fritz Wittels, *Sigmund Freud: Der Mann, die Lehre, die Schule* (Leipzig: E. P. Tal, 1924), p. 145; *Sigmund Freud: His Personality, His Teaching, and His School* (London: G. Allen & Unwin, 1924), p. 161.

44. Freud, Über Spinalganglien des Petromyzon," p. 139; see also "Über den Ursprung der hinteren Nervenwurzeln im Rückenmark von Ammocoetes (Petromyzon Planeri)," *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften [Wien]*, Mathematisch-Naturwissenschaftliche Classe 75, III. Abtheilung (1877):15-27.

45. Freud, *Introductory Lectures*, vol. 16, p. 340.

46. See, for example, Sigmund Freud, *Die infantile Cerebrallähmung*, in *Specielle Pathologie und Therapie* 9, II. Theil, II. Abt., ed. Hermann Nothnagel (Vienna: Alfred Hölder, 1897), Chap. 4, §2-4; chap. 5, §B(a).

47. Between 1880 and 1900 the concept of regression was used in an evolutionary sense by James Sully and Thomas Smith Clouston in England; by Théodule Ribot, Pierre Janet, and Paul Sollier in France; by Jules Dallemagne in Belgium; and by Adolf Meyer in America. I have discussed the history of the concept more extensively in Sulloway, *Freud, Biologist of the Mind*, pp. 272-73.

48. Freud, *Origins*, pp. 186, 231–32.

49. Sigmund Freud, "Preface to Bourke's *Scatalogic Rites of All Nations*" (1913), in *Standard Edition*, vol. 12, p. 336.

50. Sigmund Freud, " 'A Child is Being Beaten': A Contribution to the Study of the Origin of Sexual Perversions" (1919), in *Standard Edition*, vol. 17, pp. 203–4.

51. See further Sulloway, *Freud, Biologist of the Mind*, especially pp. 117–18, 327–46, 358–59, 361–415.

52. Sigmund Freud, *Beyond the Pleasure Principle* (1920), in *Standard Edition*, vol. 18, p. 60.

53. Sigmund Freud, "The Claims of Psycho-Analysis to Scientific Interest" (1913), in *Standard Edition*, vol. 13, pp. 181–82; see also *Three Essays*, p. 131; and *Introductory Lectures*, vol. 15, p. 21.

54. Jones, *Life and Work*, vol. 1, p. 307; Kris, Introduction to *Origins*, p. 43; Costigan, *Sigmund Freud*, pp. 60–61; and Max Schur, *Freud: Living and Dying* (New York: International Universities Press, 1972), p. 72.

55. Freud and Abraham, *A Psycho-Analytic Dialogue*, pp. 100, 209; Jones, *Life and Work*, vol. 1, p. 291; Freud, *Beyond the Pleasure Principle*, p. 45.

56. Freud, *Origins*, p. 324 n.

57. Sigmund Freud, *The Psychopathology of Everyday Life* (1901), in *Standard Edition*, vol. 6, pp. 143–44.

58. Otto Weininger, *Geschlecht und Charakter: Eine prinzipielle Untersuchung* (Vienna: Wilhelm Braumüller, 1903).

59. Wilhelm Fliess, *In eigener Sache: Gegen Otto Weininger und Hermann Swoboda* (Berlin: Emil Goldschmidt, 1906), pp. 22–23.

60. Freud and Abraham, *A Psycho-Analytic Dialogue*, p. 171.

61. Herman Nunberg and Ernst Federn (eds.), *Minutes of the Vienna Psychoanalytic Society*, 4 vols., trans. M. Nunberg in collaboration with Harold Collins (New York: International Universities Press, 1962–75), vol. 2, p. 432.

62. Quoted in Jones, *Life and Work*, vol. 2, p. 130.

63. Carl Gustav Jung, *The Theory of Psychoanalysis* (1913) in *The Collected Works of C. G. Jung*, 18 vols., ed. Gerhard Adler, Michael Fordham, Herbert Read, and William McGuire (Executive Editor), trans. R. F. C. Hull, Bollingen Series XX (New York: Pantheon Books, 1953–66; Princeton: Princeton University Press, 1967–76; London: Routledge & Kegan Paul), vol. 4, p. 164.

64. Freud, *Three Essays*, pp. 131, 133.

65. Sigmund Freud to Viktor von Weizsaecker, October 16, 1932, cited by Viktor von Weizsaecker, "Reminiscences of Freud and Jung," in *Freud and the 20th Century*, ed. Benjamin Nelson (New York: Meridian Books, 1957), p. 68.

66. John Chynoweth Burnham, "The Medical Origins and Cultural Use of Freud's Instinctual Drive Theory," *The Psychoanalytic Quarterly* 43 (1974): 197, n. 16.

67. Wittels, *Sigmund Freud* (English translation), p. 168; see also note 41.

68. In his *Autobiography* Charles Darwin claimed that when he opened his series of notebooks on the transmutation of species in the late 1830s, he proceeded to work "on true Baconian principles, and without any theory collected facts on a wholesale scale. . . ." In fact, Darwin assumed the truth of evolutionary theory from the beginning of his notebook series; and he practiced the hypothetico-deductive, not the inductive, method throughout his inquiries on this subject. As with Freud, Darwin's overly empiricist descriptions of his working methods as a scientist were influenced by the highly controversial nature of his theories. Privately, Darwin greatly approved of, and admitted to practicing, the hypothetico-

deductive method in all his researches. See Charles Darwin, *The Autobiography of Charles Darwin: With Original Omissions Restored*, ed. Nora Barlow (London: Collins, 1958 [1876]), pp. 119, 158–64; and Michael Ghiselin, *The Triumph of the Darwinian Method* (Berkeley and Los Angeles: University of California Press, 1969), p. 4.

A failure to distinguish properly between the inductive, deductive, and hypothetico-deductive methods in scientific research has unfortunately led Ernest Jones and other traditional Freud scholars to formulate an unnecessarily black-and-white dichotomy between *induction* and *deduction* in reconstructing the development of Freud's ideas. Given the choice between these two methodological extremes, psychoanalyst-historians have naturally sought to account for Freud's achievements in terms of a strictly inductivist (that is, a purely clinical and psychological) scientific methodology. (See note 4.) In this same connection, Stephen Brush's article "Should the History of Science Be Rated X?" (*Science* 183 [1974]:1164–72) should be required reading for those psychoanalysts who believe, like most scientists in general, that science progresses in the same empiricist manner by which it is taught.

69. See Herbert Butterfield, *The Whig Interpretation of History* (London: G. Bell and Sons, 1931). On the unique difficulties that the training analysis creates for an objective understanding of Freud, see Heinz Kohut, "Creativeness, Charisma, Group Psychology: Reflections on the Self-Analysis of Freud," in *Freud: The Fusion of Science and Humanism. The Intellectual History of Psychoanalysis*, ed. John E. Gedo and George H. Pollock, *Psychological Issues* 9, nos. 2/3 (Monographs 34/35) (1976):379–425.

70. Freud, *Three Essays*, p. 133.

71. For evidence of these omissions, see Sulloway, *Freud, Biologist of the Mind*, pp. 137, 144, 188, 198; Jones, *Life and Work*, vol. 1, pp. 288, 300, 302, 304; Freud, *Origins*, pp. 179, n. 1, 181, n. 2; and Schur, *Freud*, pp. 96, 106–7, 111, 116, 133, 143–44, 147. Although Ernest Jones, James Strachey, Max Schur, and several other psychoanalyst-historians have been permitted to see the unpublished portions of the Fliess correspondence, I was denied access to this material by Anna Freud on the grounds that the correspondence will eventually be published in full.

72. Marthe Robert, *The Psychoanalytic Revolution: Sigmund Freud's Life and Achievement* (New York: Harcourt, Brace & World, 1966), p. 98.

73. Sulloway, *Freud, Biologist of the Mind*, pp. 419–95.

74. Wittels, *Freud* (English translation), p. 107.

75. Fine, *Development of Freud's Thought*, p. 29.

76. Harry K. Wells, *Pavlov and Freud*, vol. 2: *Sigmund Freud: A Pavlovian Critique* (New York: International Publishers, 1960), p. 189.

77. Fine, *Development of Freud's Thought*, p. 31.

78. Many researches have confirmed Freud's clinical observation that certain character traits cluster in identifiable patterns that Freud termed "oral" and "anal". What has not been confirmed, however, is that these character traits definitely have their origins during the various developmental stages, and in association with the specific erotogenic zones, claimed by Freud. See further Paul Kline, *Fact and Fantasy in Freudian Theory* (London: Methuen, 1973), pp. 45–94, 346–47; and Seymour Fisher and Roger P. Greenberg, *The Scientific Credibility of Freud's Theories and Therapy* (New York: Basic Books; Hassocks, Sussex: Harvester Press, 1977), pp. 80–169, 399–402.

79. Freud's genius lay less in the discovery of totally original facts and theories, as legend would have us believe, than in his synthesis and brilliant intellectual transformation of numerous preexisting lines of research. I have expanded upon this concept of intellectual transformations as it applies to Freud's creative achievements in Sulloway, *Freud, Biologist of the Mind*, pp. 193–94, 203–4, 205, 213, 215, 218, 231, 235, 236, 318–19, 358, 373, 475, 497, 499–500. See also I. Bernard Cohen, *The Newtonian Revolution in Science, with Illustrations of the Transformation of Scientific Ideas* (Cambridge and New York: Cambridge University Press, 1980).

80. For informative assessments of the present status of Freudian theory, including critical reviews of the numerous attempts to test psychoanalysis experimentally, see the literature cited in note 77.

81. Havelock Ellis, Review of *A Psycho-analytic Study of Leonardo da Vinci [Eine Kindheitserinnerung des Leonardo da Vinci]*, by Sigmund Freud, *The Journal of Mental Science* 56 (1910):523.