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Matters of Sex and Gender in F. J. Gall's Organology: A Primary Approach

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The originator of phrenology, F. J. Gall (1758–1828), saw himself as a natural scientist and physiologist. His approach consisted of brain anatomy but also of palpating skulls and inferring mental faculties. Unlike some of the philosophical principles underlying Gall's work, his conception of sex/gender has not yet been examined in detail. In this article, I will focus on Gall's treatment of men and women, his idea of sex differences, and how far an assumed existence of dichotomous sexes influenced his work. In examining his primary writings, I will argue that Gall held some contradictory views concerning the origin and manifestation of sex/gender characteristics, which were caused by the collision of his naturalistic ideas and internalized gender stereotypes. I will conclude that Gall did not aim at deducing or legitimizing sex/gender relations scientifically, but that he tried to express metaphysical reasons for a given social order in terms of functional brain mechanisms.

Keywords Franz Joseph Gall, organology, phrenology, sex, gender, sexuality, differences, stereotypes, dichotomy

Introduction

> What would become of the propensity to propagation, if there were not two sexes?—[B]ut two sexes exist. (Gall, 1835f, p. 243)

In his 2005 article on the "neuronal nature of femininity," Frank W. Stahnisch pointed out a remarkable desideratum in the historiography of eighteenth- and nineteenth-century medicine concerning the mutual influences of sex or gender concepts and the neurosciences on one another (Stahnisch, 2005). This mutual influence is particularly notable in the case of Franz Joseph Gall (1758–1828), who is very well known as the originator of a "cult" (Clarke, 1970, p. 22) or "fleeting fashion" (Regal & Nanut, 2008, p. 314) erroneously named "phrenology" (Noel & Carlson, 1970; van Wyhe, 2002, p. 22). With his so-called *organology*, Gall tried to localize distinct functions in several organs of the brain and to develop a scientific theory of the mind and propensities in humans and nonhuman animals. His biography, the philosophical foundations of and influences on his work as well as his contributions to contemporary neurobiology have already been treated with historiographical attention, but, apart from Stahnisch's work, there is a significant absence of research

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on Gall's concept regarding sex/gender.[1] I do not know of a single study focused on the question of how Gall posed innovative views regarding the neuronal nature of sex/gender dichotomies with his doctrine about the brain.

A source-based reflection tracking conceptions of sex/gender in the early days of brain localization is feasible because there is a considerable amount of primary literature that can be analyzed on this issue. Moreover, an analysis of Gall's work is particularly desirable in this connection if we believe that Gall's "immediate neuroanatomical contributions . . . have been insensibly absorbed into the corpus of our knowledge" (Critchley, 1965, p. 778). Hence, I will spell out Gall's notion of this category on several levels: femininity and masculinity in society (androcentrism, stereotypes), sexed matters in bodies (brains, skulls), as well as sexuality and propagation. It is neither my intention to give a thorough account of Gall's personality and research nor to discuss in how far the latter can be considered as revolutionary or scientifically valuable. Instead, I will focus on his work with and on women and men in order to argue that his new psychological system that was meant to link mental properties and anatomy included the quest for the material foundations of human sex/gender identity. To this end, I will elaborate on his opinion of the hard-wired nature and absoluteness of a male/female dichotomy on various anatomical and behavioral levels.

This enterprise is very promising, as Gall repeatedly made surprising remarks regarding femininity that seem contrary to the role of women in his time: he refuted the contemporary findings of sex-dependent nerve differences in brains (Gall, 1835b, p. 190); he fought the ban against women attending his lectures (Vereinte Hofstelle, 1802, pp. 19–20; Walther, 1804, pp. 6–7); he bemoaned how fashion bound women's bodies (Gall, 1791, pp. 307–310); he demanded sex education for women and institutions for anonymous births (Gall, 1806a, pp. 360–361); he did not introduce an organ in the brain for sex/gender identity; he stored dozens of skulls without noting the sex of the donator (Ackerknecht & Vallois, 1956, pp. 42–60); finally, he believed in a periodical distraction for men that was similar to the female menstrual cycle (Gall, 1835a, p. 300, 1835d, pp. 217–225).

In a defense of his scientific method in response to criticisms by contemporaries, Gall made his awareness of the importance of observations relating to sex/gender differences very clear. He claimed reliability by listing his methods, which were, among others, the following: comparing the brains and skulls of species and individuals with a strikingly strong or weak instinct for sexual propagation—including "erotic mania"—and a good or bad sense for distinguishing the sexes within their species; examining cerebella of humans with deviant sexual habits; evaluating mutual stimulations of animals during coitus; investigating effects of differently severe lesions of genitals on the cerebellum and vice versa; and analyzing apoplexies during sexual intercourse in humans (Gall, 1835f, pp. 104–105). In the following, I will exploit such excerpts dealing purposefully or implicitly with sex/gender. I will consider parts of Gall's own published writings[2] as well as two summaries that

[1]In his French writings, Gall used the term *sexe* relating to male/female. I have chosen "sex/gender" to follow the German expression *Geschlecht*, which includes not only sex and gender but can also relate to genitals and entire lineages. The double term is also in line with current debates on the neuroscientific usage of "sex" and "gender" (cf., e.g., Kaiser, 2012).

[2]His first monograph (Gall, 1791); a published letter containing the first printed account of his doctrine (Gall, 1798); an anonymously published work (Gall, 1806a) of which he confessed his authorship in a letter (B. Heintel & Heintel, 1985, pp. 14–18); a diary on his lecture tour through Germany (Gall, 1806b); an anthology containing a memoir on brain anatomy, its review by some members of the *Institut de France*, as well as Gall's comments on their text (Gall & Spurzheim, 1809); two encyclopedia entries on the brain and the skull respectively (Gall & Spurzheim, 1813a,

were printed earlier (Arnold, 1805; Blöde, 1806).[3] I will group the excerpts regarding subject matter after summarizing Gall's biography and organological system in the next section.

F. J. Gall and Organology

Franz Joseph Gall[4] was born as a merchant's son in 1758 in Tiefenbronn, a small Swabian town, which he left in 1777 to commence his medical studies in Strasbourg. Four years later, he moved to Vienna, where he obtained his MD in 1785 and became a successful physician very quickly. Gall married Maria Katharina Leis(s)ler (1760–1825), whom he had met in Strasbourg.

By 1796 at the latest, Gall began giving lectures open to the public on his "doctrine of the skulls" (*Schedellehre*, Gall, 1806a). It was a system meant to reveal the true nature of life and to lay out the principles of the innate aptitudes and the manifested character of humans and animals through determining the shape of their skull. Gall claimed that the brain of every living creature consisted of several distinct organs, each of which was responsible for a specific faculty central to bodily functions or to moral and intellectual capacities. He named 27 distinct faculties; all of them present in the brain of humans and a smaller number in animals, depending on the species in question. He considered none of these aptitudes to be good or bad per se (Gall, 1835a, p. 216, footnote) as he maintained that every faculty could turn into a devastating drive if its organ was over- or underdeveloped. For example, the ability to raise and love children could turn into both the hatred and murder of children, or into spoiling them tremendously (Gall, Spurzheim, & Fossati, ca. 1830). Gall assumed that the strength of the faculties corresponded with the relative size of the organs, and that their distribution caused the form of the brain in each individual (Gall, 1798). Therefore, Gall also referred to his doctrine as "organology" (*Organologie*, van Wyhe, 2002, p. 22), a fact that stresses his belief that the material parts of heads were able to tell about the natural order of life as well as the predispositions of species and individuals.

To unravel these "truths of nature" (Walther, 1804, pp. 25–26), Gall studied the heads of living humans and animals as well as of the dead. He received brains belonging to deceased inmates from mental asylums and prisons, but he was not equipped with a method to preserve them and their number was not sufficient for his purposes in comparative anatomy. Because he believed that the shape of the cranium followed the profile of the brain (Gall, 1798), however, he palpated skulls of living and dead bodies instead, searching for dents and protuberances even millimeters in size. He was convinced that this procedure allowed him to infer the form of the brain and the size of its organs and therefore the innate aptitudes of each investigated subject. Even so, he often emphasized that these might differ from the actual character of the individual in question. He stated that education

1813b); another anthology containing English translations of a piece on the functions of the cerebellum and their relation to sexual reproduction, remarks by Gall on some of his critics doubting this very connection, and a reply to a decree of 1801 (Vereinte Hofstelle, 1802) issued by Franz II that prohibited his lecturing in Vienna and the rest of the Holy Roman Empire (Gall, Vimont, & Broussais, 1838); another publication of the latter in German (Walther, 1804); the English translation of a second edition of Gall's main work of 1822 (Gall, 1835a, 1835b, 1835c, 1835d, 1835e, 1835f).

[3] Judging by the expressions and examples used by Gall in his own work, these summaries sound like a faithful report of Gall's lectures; and, what is more, Gall recommended them himself until he finished his own treatise (Gall, 1806a, p. 288, 1806b, pp. 270–273, 347–348).

[4] For his biography as displayed in what follows, see Schramm-Macdonald (1878), Hollander (1928), Ackerknecht and Vallois (1956), Ackerknecht (1964), Lesky (1979), Cooter (1984), B. Heintel and Heintel (1985), H. Heintel (1986), and van Wyhe (2002).

and training could and should be of help to suppress some natural drives and to strengthen others in order to perfect oneself and to commit to following the law and to maintaining social order (e.g., Arnold, 1805, p. 173; Gall, 1806b, pp. 73–74; Gall & Spurzheim, 1809, pp. 461–462).

On the one hand, these lectures established his fame, while also causing severe problems for his work on the other hand: in 1802, Gall received a letter in which he was accused by Franz II, Emperor of the Holy Roman Empire, of spreading materialistic ideas that posed a threat to religion and morality (Vereinte Hofstelle, 1802). Gall fought the decree without success. Together with his assistant Johann Gaspar Spurzheim (1776–1832), a servant, a wax molder, two monkeys, and dozens of skulls and brain models he needed for demonstrations, Gall went on tour from March 1805 to October 1807. He taught his doctrine in more than 50 continental European cities, delivered public and private lectures, met with society circles and examined the heads of prison and mental asylum inmates until he settled down in Paris in 1807. His wife remained in Vienna.

Shortly after his arrival in Paris, Gall launched a new medical practice, and he was allowed to start one of many widely attended series of public lectures. Moreover, for the first time in his career, he took the time to work on a treatise on his system of the brain and its functions. In the process of writing the treatise, Spurzheim and Gall split in 1813: Gall wished to set up an anatomically grounded physiological theory, while Spurzheim wanted to establish an applied practice of reading heads and advising people. From their separation on, Spurzheim laid the foundations for what is still known as "phrenology"—an expression never used by Gall for his organology (Giustino, 1975, p. 15).

Shortly after his wife died, Gall remarried in 1825 to his companion Marie Anne "Virginie" Barbe (1795–?). He undertook only one short lecture tour to England in 1823 before his death near Paris in 1828, and he had not appointed any direct successor to continue his teachings and practice. However, in accordance with his instructions, his head was removed from his body by a student of his and added to his collection of heads. Gall's corpse was buried in unhallowed ground at the public cemetery of Père Lachaise because he had rejected a Catholic burial after his works had been censored.

Sex, Gender, and Sexuality

Androcentrism and Stereotypes

In the late eighteenth century, the idea of men and women being dichotomous not only regarding their genitals but also concerning their minds had not yet been questioned in France and the German-speaking European countries (e.g., Jordanova, 1989; Schiebinger, 1990; Honegger, 1992; Stahnisch, 2005). Until several decades after Gall, the concept of women as imperfect men was prevalent in social, religious, and scientific discourses: women's bodies were seen as underdeveloped, weak, and susceptible to illness, their rational capacities and moral judgment were questioned, and female aspiration to live independently from male guidance was denied. Men were regarded essential protectors of women's naturally feeble bodies, timid souls, and defective moral (Lange, 1992; Knibiehler, 1993; Tuana, 1993).

Material differences in male and female bodies have been studied since antiquity. In turning away from humoral medicine around 1800, however, these assertions gained unprecedented biological authority due to studies carried out by prominent anatomists and

physiologists (Laqueur, 1992). Gall's contemporary Samuel Thomas von Soemmerring (1755–1830), for instance, assessed sex/gender differences on several levels—from human bones to the nervous system (Schiebinger, 1987). His student Jacob Fidelis Ackermann (1765–1815) used a similar approach and tried to replicate Soemmerring's findings of hard-wired differences in male and female brains.[5] Although Ackermann did not succeed in doing so, his and other neuro-anatomical endeavors aimed at explaining the contemporary social order scientifically (Laqueur, 1992; Stahnisch, 2007b). These male researchers interpreted their findings as proof of the biologically grounded inferiority of women (Schiebinger, 1989; Tuana, 1993).

The common view of sexuality was derived from this dichotomic sex/gender conception: women were regarded sexually passive and were mostly defined according to their ability to give birth (Lange, 1992). By the time Gall was practicing, however, this view started to change; more pleasure and self-determination were attributed to women with regard to their sexual activity (McLaren, 1974; Matthews-Grieco, 1993). Influenced by his social and intellectual environment, it seems unsurprising that Gall divided humans, animals, and plants into male and female (Gall, 1791, p. 143) and held misogynist views. Most of the detailed characteristics that Gall assigned to men and women can be subsumed under the following stereotypical roles.

Men are archetypical humans. Gall referred to the human species as "man," and his androcentric use of pronouns sometimes even conceals that several case studies of his involved women. Unless he gave a detailed biographical account, Gall always used "he" for persons of any age who were mentioned regarding their humanness—most of the time in discrimination of animals or when he wrote about sexual stimulation (e.g., Arnold, 1805, pp. 203–204; Blöde, 1806, p. 139; Gall & Spurzheim, 1813a, p. 467; Gall, 1835a, p. 78; Gall, Vimont, & Broussais, 1838, p. 94).

As was common use in scientific writing at the time (Crampe-Casnabet, 1993, pp. 319–324), sections in which Gall wrote explicitly about women are often separated from investigations of humans in general, that is, males. This point is illustrated very well in Gall's consideration of the influence of brain diseases on genitals and propagation (Gall, Vimont, & Broussais, 1838, pp. 16–94): in describing the general relation between sexuality and the brain, he referred only to males; then he proceeded with elaborations on "idiots" and "cretins" (Gall, Vimont, & Broussais, 1838, pp. 66–68), before he concluded with remarks on women (Gall, Vimont, & Broussais, 1838, pp. 69–71). By doing so, Gall positioned females as a curious instance of humanity, even without drawing an explicit comparison between women on the one hand and people with mental handicaps on the other hand. Nevertheless, Gall's efforts to retain the right of lecturing in front of women (Vereinte Hofstelle, 1802, pp. 19–20; Walther, 1804, pp. 6–7) demonstrate that he attached considerable intellectual qualities to them—unlike political and social authorities.

The above-mentioned impression that Gall regarded women as some sort of deviant "men," however, is further fortified by the fact that he displayed only meager interest in studying females to gain more knowledge about human sexuality in general: examining cases of postmortem erections, Gall explicitly compared women and men in their bodily reaction to strokes, but he named only one study of his involving a female stroke patient, and it does not appear that he continued research on this topic (Gall, Vimont, & Broussais, 1838, p. 89).

[5]For more information on the controversy between Soemmerring, Ackermann, and Gall, see Gall (1806a), van Wyhe (2002), and Stahnisch (2005, 2007a).

Women are desired sexual objects. In his work, Gall referred to women as the "fair sex" (*das schöne Geschlecht, le beau sexe*, e.g., Gall, 1791, p. 136; Gall & Spurzheim, 1811, p. 223; Gall, 1835e, pp. 139, 246) whose task in the world was to "create(s) in the male the instinct of generation" (Gall, 1835a, p. 132) and to please men by caring for them and cheering them up (Gall, Vimont & Broussais, 1838, p. 29). Consequently, he drew parallels between females and fruits in the sense that both were able to gain the highest attention of male mammals, just by being presented to them (Gall, 1835a, p. 158).

It seems that Gall regarded especially attractive girls as prone to awakening premarital instincts of generation in men; the more beautiful a young woman was, the more likely Gall considered her to become pregnant unwillingly. According to Arnold's account of his lectures, Gall saw advantages for illegitimate children: because premarital coitus was not permitted, the rendezvous had—from the man's point of view—to be worth going behind the back of the woman's family. This, Gall argued, assured a certain degree of beauty and cleverness in the unmarried woman, which then might be passed on to potential offspring conceived through this very relationship (Arnold, 1805, p. 49).

Women are unreasonable and overwhelmed by emotions. Gall saw a threat to family harmony in women's tendency towards "insane jealousy" (Gall & Spurzheim, 1811, p. 223). In his view, their temper was either so soft that it suppressed their memory and made them lethargic in relationships, or it was very sharp, led them to make many mistakes and caused an ample imagination as well as the ability to concentrate all of their energy on a specific concern. One of his catalogues of male and female stereotypes ends with the picture of a woman as "suffering sinner," that is, as one to trip, to fall, and to regret for life that she succumbed to a fleeting hankering (Gall, 1791, p. 116). This supposed irrationality may be one reason why Gall admitted problems in extending his organology to women: "We know very well that the heads of the women are difficult to unravel," he wrote in a published letter (Gall, 1798; English translation in Gall, 1835a, p. 17).

Men are fighters and protectors. In Gall's worldview, men had to care for women and children—an instinct that included fighting. He considered this predisposition to be so powerful in young men that he thought a horn sounding the charge could cure them from various illnesses spontaneously (Gall, 1791, pp. 561–562). In later years, according to the picture Gall drew of them, men sit at home "absorbed in grief" (Gall, 1791, p. 116)—probably pondering the unreliable personalities of women in their families mentioned above.

Women are weak and malleable. His observation that women usually lived longer than men led Gall to assume this was due to their inherent feebleness (Gall, 1791, p. 136). Gall explained this seemingly contradictory assertion with the following line of reasoning: according to him, the fact that women were weaker than men made them less resistant to exterior influences of any kind. On the one hand, he admitted, this made women susceptible to sickness and deteriorating depressive emotions (Gall, 1791, p. 356). On the other hand, he argued, female liability to influence made them also more susceptible to medical treatment, whereas stronger organisms used to hard work and meagerness—that is, men—were more resistant to exterior forces and, therefore, often unresponsive to medical interventions (Gall, 1791, p. 548).

One exception to the prevalence of female weakness known to Gall, however, was the unimagined strength women could develop through motherhood. He even reported cases when mothers were cured precipitously in response to their children needing them (Gall,

1791, pp. 561–562). Yet, in general, Gall considered female fragility to be so fundamental that it even manifested itself in the process of dying: for women predominantly after fainting, for men usually in death throes (Gall, 1791, p. 314).

Although Gall's case studies and the artifacts of his specimen collection (Ackerknecht & Vallois, 1956, pp. 42–60) leave the impression that he examined more men than women, he obviously engaged with the latter in his organological practice. Moreover, Gall is said to have had intimate acquaintances with many women—one of which led to an illegitimate son (Ackerknecht & Vallois, 1956, pp. 7–8). Consequently, his prejudices do not result from isolated reflection; most likely, Gall absorbed contemporary female and male role models and integrated them into his doctrine. Most of the stereotypes presented above, however, lack any organological proof or explanation in Gall's texts. Thus, his ideas of the interconnection between sex/gender and the material body will be presented in the following.

Brain and Skull

Gall declared at least once: "Let any one [*sic*] present me, in water, the fresh brains of any two adult animals whatever, the one male and the other female, and I will distinguish the two sexes without ever being deceived" (Gall, 1835c, p. 288).[6] But, in contrast to how this quote is at times presented (e.g., Critchley, 1965, p. 780; Hyde, 1990, p. 56; Jordan-Young, 2010, p. 49), this was not an argument for hard-wired differences between the sexes in every instance of their existence. First, there are more passages in which Gall stressed that, in some cases, the variability between *human* individuals of one sex might overcome dichotomies between the two groups (e.g., Gall, 1806a, pp. 358–359; Gall & Spurzheim, 1811, pp. 34–36, 1813a, p. 469; Gall 1835a, p. 182; Gall, Vimont, & Broussais, 1838, pp. 28–32)[7]; second, by demanding *adult* animals, he demonstrated knowledge of an idea resembling what is known today as brain plasticity, that is, that it is possible to strengthen one's organs by making use of them, or to weaken them by not realizing or stimulating the corresponding drives (Gall, 1806b, pp. 244–247).

However, Gall argued that "social life" did not "*produce(s)* certain faculties" (Gall, 1835a, p. 162, italics added) but merely *fortified* them. More specifically, concerning the sex/gender issue, he stated that "[t]he whole education of women tends to confirm this natural modesty [of being timid and bashful]" (Gall, 1835a, p. 299). Thus, Gall was clearly not a constructivist, even though he admitted the possibility of shaping one's character traits by pursuing certain ways of life. For example, he admitted that education might strengthen sex/gender-specific behavior, although only within the boundaries of their assigned female or male nature (Lesky, 1979, pp. 101–103)—apart from exceptions (Gall, Vimont, & Broussais, 1838, pp. 28–32).

It is true that one of Gall's repeatedly stated principles claimed that "often the same fundamental forces are found to exist in different degrees in the two sexes, and that, in this case, the organ of the quality or faculty has a degree of development differing in the two sexes" (Gall, 1835e, p. 250). Nonetheless, there are only a few out of altogether 27 cranial organs of which Gall specified a difference in size and function depending on the sex. For instance, he thought the organ for "distinguishing the relation of colors, talent for painting" (no. 16, *Farbensinn*, Gall, 1835e, pp. 46–50) was larger in women. Hence, he believed to

[6] A similar passage can be found in Gall (1806a, pp. 318–319).

[7] However, this does not hold true for animals (Gall, 1806a, pp. 318–319).

have found an explanation "why female artists, who in every other respect rarely equal men of genius, raise(d) themselves sometimes to the level of the most distinguished painters in the art of coloring," why they preferred paintings to monochrome busts, and why they were so fond of colored dresses (Gall, 1835e, p. 54). Similarly, Gall thought the organ of "comparative sagacity" (no. 20, *vergleichender Scharfsinn*, Gall, 1835e, pp. 121–128) was smaller in women and caused their tendency to believe in superstitions as well as their lack of a sense of logic so "they hardly realize that there can be no effect, no event, without a cause" (Gall, 1835e, p. 136).

Furthermore, there were some organs whose size Gall did not declare to depend on sex/gender but that still differed in their outcome, for example, the organ for "vanity, ambition, love of glory" (no. 9, *Eitelkeit, Ruhmsucht, Ehrgeiz*, Gall, 1835d, pp. 184–195): in a man, a strong development of the organ would only lead to unpleasant vanity, while in women the thirst for glory would threaten the domestic peace because wives held clothes and money in higher estimation than caring for children and having a pleasant relationship with their spouse. It even appears that this remark concerned the husbands' clothes (*Anzug*) and not the women's own dresses (which would be *Kleider*, Arnold, 1805, pp. 284–286). This suggests an even larger dissimilarity in the manifestation of several organs in males and females: they would not only differ in their strength or target object but also with regard to its possessing subject—an instance that lines up with Gall's view of the timid woman stated above.

Gall's numerous examinations of 3- to 16-year-olds assured him that these differences could even be found in children. Furthermore, he had skulls belonging to children younger than 3 years at his disposal, some of newborns and animal embryos. He aimed to prove that differences concerning sex could already be recognized prenatally but also, more importantly, that brain development was not yet complete at the age of 2. He grounded this view on the absence of sexual drives in children that were accompanied by a significantly smaller size of their cerebellum. In this part of the brain, Gall located the organs for sexual reproduction and the love for offspring (e.g., Gall & Spurzheim, 1813a, pp. 467–468; Gall, Vimont, & Broussais, 1838, pp. 16–28). In examining different skulls, Gall suggested comparing girls' and boys' crania separately since a protuberance corresponding to their organ for propagation should already be "far more remarkable" in boys—even if they were younger than the girls (Gall, 1806a, pp. 314–315). Otherwise, he feared, one might obtain no substantial results from the comparisons. By delivering this recommendation, Gall acknowledged severe variances between the skulls of different individuals within groups of either boys or girls (Gall, 1822, pp. 303–304), and he did not want these to be mixed up with dissimilarities caused by sex.

So far, I have shown that Gall's perspective of living beings was imbued with contemporary stereotypes and that he integrated these biased illustrations in his scientific publications. Moreover, I have provided evidence that Gall's organology was not only about descriptions and "feeling 'bumps'" (Ackerknecht & Vallois, 1956, p. 8) but about assigning meaning to his observations and using them to distinguish between male and female heads—no matter the species or age.

Concerning the quote on male/female brain differences at the beginning of this section, it is very likely that Gall was referring to the assumption that the protuberances on the surface of male brains belonged to the organ of propagation, and, even more significantly, that the female cerebella corresponded to the organ for love of offspring (Gall, 1806a, pp. 358–359, 1835c, pp. 281–284). Thus, I will examine these two important faculties linked to sexuality and reproduction in more detail below.

Propagation and Heteronormativity

One aspect of Gall's doctrine that bears close resemblance to Romantic thought in general and to the idea of "the Great Chain of Being" specifically (Lovejoy, 1936; Hall, 1977) was his distinction between less and "more perfect animals" (e.g., Gall 1835a, p. 79); only the latter used a sexual act for propagation of their species, and in all of them Gall had found a structure that resembled the human cerebellum (*das kleine Gehirn*). He declared this part of the brain to be the only "connexion [*sic*] between the sexes" (Gall, 1835f, p. 102), meaning this was the single reason for copulation. Furthermore, Gall inferred that the cerebellum was the location of the "most noble" organ (Gall, 1806a, pp. 181–182, 312–313)—that is, the one for propagation—and that the ability to differentiate between the sexes was one of its outcomes (Arnold, 1805, p. 178; Gall, Vimont, & Broussais, 1838, pp. 18–19, 33). This organ's existence and position occurred to Gall for the first time when he met a "hysterical" widow suffering from epileptic fits because she could no longer fulfill her sexual desires (Gall, 1806a, p. 344). In accordance with subsequent animal studies, he claimed to have found a direct connection between her hot, painful neck and her sexual longing (Gall, Vimont, & Broussais, 1838, pp. 12–15).[8]

In further experiments and observations, Gall tried to deepen his understanding of the interconnection between the cerebellum, genitals, and sexual activity (e.g., Gall, 1806a, pp. 346–352; Gall, Vimont, & Broussais, 1838, pp. 16–71). Even though he admitted that there were individually different life cycles that awakened the sexual drive in some individuals earlier or made it last longer, Gall had no room for investigations regarding nonheterosexual desire—quite unsurprisingly, considering the heteronormative society at the time (Matthews-Grieco, 1993; Herrn, 1995). In his view, the desire for intercourse overwhelmed children from the outside at a time predetermined by the maturity of their brain:

> The sexual instinct develops itself in a corresponding order of progression. It glides imperceptibly into the mind of the young of either sex; the eyes become more brilliant; the look more expressive; the gait acquires an air of increased pretension; they are liable to be seized with an inexplicable infantine melancholy; they feel a want for which they cannot account; they experience confused desires; until at last the presence of a beloved object solves the enigma, and spreads a vivid pleasure over the whole soul. (Gall, Vimont, & Broussais, 1838, pp. 18–19)

In the context of the quoted passage, Gall did not question that this beloved object belonged to the "opposite sex" (Gall, Vimont, & Broussais, 1838, p. 21) and that exploring the own infantile sexuality via "onanism" prior to engaging in sexual intercourse was a "pernicious habit(s)" that ought to be prevented by parents (Gall, Vimont, & Broussais, 1838, p. 22). Nonetheless, Gall also laid out that mental illnesses and obsessive masturbation could be caused by the same brain disease—instead of naming masturbation as a reason for losing one's mind (Gall, 1806a, pp. 339–340). Be that as it may, Gall did not break with the predominance of reproductive sexuality in his time.

In his system, Gall distinguished between two "natures": the specific assembly of the organs of an individual versus an underlying order of the world. Consequently, unnatural

[8]The idea of female hysteria as result of infrequent sexual intercourse or other emotional causes became prevalent towards the middle of the nineteenth century (see Micale, 1991; Tuana, 1993, pp. 93–107).

or perverted behavior, in the sense that it deviated from social norms, could still be caused by the natural drive of an individual. Thus, Gall demanded children who were masturbating be stopped from doing so even though he did not blame them for their desire to engage in this activity. Likewise, Gall committed himself to the improvement of prisons and mental asylums because he found many of the inmates irresponsible for what they had done: for him, the "perverted drive" of the rapists, pedophiles, homosexuals, and zoophiles arrested in prison was due to a "perverted development" of their organ of propagation, and not the personal fault of the individuals (Gall, 1806a, pp. 345–346).

If the organ was but "too little developed," Gall wrote, it might cause "impotence, indifference, or even aversion to the other sex" (Gall, 1835a, p. 216). To him, these instances were natural consequences of the perverted constitution of the organs of the brain. Simultaneously, he feared that these developments might endanger "[t]he propensity to propagation . . . , the most necessary institution of the Creator" (Gall, 1835a, p. 216). Thus, he made clear that concepts of sexuality apart from heterosexuality leading to reproductive intercourse with another person were a threat to the *natural* order. Yet, Gall did not consider all of these to affect the *social* order in a way that allowed imprisoning the deviating individuals. This leniency also affected individuals who would be known as *transgender* in today's society:

> There are cases, where, by an alteration of the organs, the me is transformed into another me; for instance, when a man believes himself transformed into a woman, a wolf, [et] c[etera]; . . . not an uncommon accident after severe disease, especially in cerebral affections. (Gall, 1835c, p. 76)

With these observations, Gall wanted to illustrate the interdependency of mind and brain that made people irresponsible for their disposition. Even so, he implicitly stated his acceptance of a nineteenth-century aversion to abnormalities of unchanging sexes in heterosexual relationships; to him, deviations from this order were mental illnesses akin to any other delusion.

According to Gall, the disinterest of immature children in "the other sex" had been developed by natural forces to make breastfeeding and further features of parental care possible on a nonsexual basis (Gall & Spurzheim, 1811, p. 95). The same holds true regarding the love of offspring, which he supposed to be significantly more developed in females than in males and "ennobled in man; . . . [in a way that it] becomes, in women, the amiable virtue which inspires their tenderness for their children" (Gall, 1835a, p. 103). Gall noted the predisposition in females to bear and raise children even in small girls whom he observed to experience a unique pleasure in playing with their dolls (Gall, 1806a, p. 358).[9] On the one hand, he stated that this female affection for children—not necessarily their own flesh and blood—resembled the natural behavior of monkeys (Gall, 1835c, pp. 264–266); and, on the other hand, that it outweighed even the passion for "moral love" unique in humans (Gall, 1835a, p. 103). Gall illustrated the latter with examples of unhappily married women who remained with their husbands for the benefit of having children (Gall, 1835c, pp. 279, 284) and willingly unmarried women[10] who adopted children (Gall, 1806a, p. 358).

[9]The most advantageous physical characteristics to carry out this task can be found in Gall (1791, pp. 307–310).

[10]Gall formulated possible reasons for staying unmarried: fear of financial responsibility, self-centeredness, and the inability to sustain emotional relationships. Unlike Spurzheim, he believed

Gall reported to have observed the continuance of characteristic sex differences even during the considerable transformation of male and female bodies during puberty. In his view, this could only be explained by a resistance in brain physiology to the many changes in the external organs (Gall, Vimont, & Broussais, 1838, p. 3). When children were finally ready for propagation, he maintained that the boys played the "attacking part" in the game of love, not unlike male animals (Gall, 1791, p. 29, 1806a, p. 318). Gall pointed out that men were generally more enthusiastic about coitus than women (Gall, 1806a, p. 320). However, he found exceptions in women with a stronger sexual drive than most men (Gall, Vimont, & Broussais, 1838, p. 24) and in men who were not interested in coitus at all—most of them true genii (Gall, 1806a, pp. 318–319). Still, the ideal of humans and animals without "incomplete"—that is, ambiguous—genitals (Gall, 1806a, p. 320) and with joyful engagement in heterosexual intercourse (Gall, 1791, pp. 29, 47, 576, 636, 650, 1806a, pp. 312–313, 1835c, pp. 141–142) persisted. It is important to note that this depiction belonged to the role model for both sexes; a notion I have found in the way Gall shared his observations of the mutual stimulation of males and females during animal coitus (Gall, 1835f, p. 104). Additionally, in several passages in texts on the human sexual drive, he expressed sympathy for women not being sexually aroused or satisfied by their husbands (Gall, Vimont, & Broussais, 1838, p. 17), which suggests that he regarded the opposite of their situation as desirable.

As mentioned above, playing the active part in sexual intercourse, however, was a sex/gender-specific behavior to Gall, as was caring for children: "There are a few men who show female love towards children" (Gall, 1806a, pp. 358–359), he named one of the exceptions he had found in humans but not in animals. In a similar way, Gall described a woman with a feebly developed organ for the love of offspring: "[S]he has hardly the character of her sex. Her principal destination is wanting" (Gall, 1835c, p. 282). From the quoted passages, it becomes clear that Gall declared behavior to be sex/gender specific; a very close look might even suggest that he imagined female traits of character to be additive in men, while resembling a man caused the loss of femininity in women. Gall did not make it explicit, but this interpretation is in line with the analysis of Gall's view of men as archetypical humans provided above: men might show atypical features, but if women did so, this meant a loss of integral features of their already deviant humanness.

Nevertheless, in the same passage quoted above, Gall also admitted that a woman should not be reduced to her ability to bear children and that even a sterile wife could be a "companion who is very estimable in all other relations" (Gall, 1835c, p. 282). In addition to this unexpected acknowledgement of women who seemed not to fulfill their allegedly principal role, Gall even wrote about the advantages of androgynous humans: he explained that a "happy union" of male and female characteristics produced an "enviable disposition" in the sense that the resulting body was neither too weak to stand the trials of life, nor too strong to resist medical treatment—therefore, it was predestined for a long and healthy life (Gall, 1791, p. 136).

These puzzling instances of convergence of men and women on the one hand and pointing out differences on the other hand do not unravel Gall's idea of sex/gender dichotomies thoroughly. Gall obviously presented stereotypes to which he had imparted a scientific language and explained their realization using the idea of sex/gender-specific parts of the brain and its organization. I have also shown, however, that he

that there were no material foundations for monogamy in humans and animals. He admitted, however, that the two of them had been engaged in a search for an organ for marriage (see Gall, 1835c, pp. 305–306).

held some anti-androcentric views. The extent to which Gall thought that dichotomous sex differences were innate is not entirely clear. Gall's conception of a divine creation and natural forces, as outlined in the next section, will lend a hand in solving this enigma.

Inherent Reality versus Exterior Force

In some case studies, Gall paid special attention to observations in which no sex/gender differences were found in the performance or bodily structure of the examined individuals (e.g., Gall, 1822, p. 341, 1835b, pp. 218–219). These instances point to his notion of differences between two sexes as an underlying truth of nature. It was this view that led Gall to the assumption that individuals were unambiguously sexed, even though they might be too young or too limited to notice their own or others' affiliation to the sexes (Gall, 1835b, p. 213, 1835f, p. 257). Judging by the examples he used, his differentiation between two sexes among individuals of the same species seemed the most obvious to him. In addition, although I found many places where Gall listed sex as one of several influences on the development of living beings, it was nearly always the first or most elaborated one (e.g., Gall & Spurzheim, 1811, pp. 44–48; Gall, 1835a, pp. 150–151, 1835b, 271). Gall consistently placed the organs for propagation and the organ for the love of the offspring in the cerebellum, as close as possible to the spinal cord, which he assumed to be the seat of the most natural and important faculties (Gall, 1806a, p. 355).

Congruently, Gall attached so much importance to the category "sex" that he presumed it could inhibit several inherited traits if they did not fit the sex of the growing person. For example, if daughter and son resembled the mother, this similarity had to stop at some degree in the boy—because he was male, and too much resemblance with a female being was not "permitted" in Gall's system (Gall & Spurzheim, 1813a, p. 469). Still, even though he obviously believed in sex-dependent constraints for skills, Gall admitted that he had met the twin sister of a boy of "most humble mediocrity" who was, despite her heritage, able to "raise(s) herself, in many respects, above her sex" (Gall, 1835a, p. 184). Gall was thus able to see and publish instances of behaviors and skills that seemed contrary to a respective sex/gender role. More noteworthy than the obvious possibility of exceeding these constraints in exceptional cases, however, is the organological notion of predetermined limitations depending on the sex, which, again, was well in line with contemporary scientific and religious sex/gender concepts as laid out previously.

With regard to other case studies, however, it becomes clear that Gall did not consistently proclaim the determinative materialism he was criticized for by contemporaries. For example, he named the periodical change of the willingness for reproduction in female animals tethered to mating seasons as the reason for their smaller cerebellum—not the other way round (Blöde, 1806, p. 65). Gall denied the natural or social evolution of faculties in new generations (Gall, 1806b, pp. 244–247) and was convinced that a species could not improve itself fundamentally. On the contrary, he argued, any combination of brain organs had been assigned to a specific group on purpose in order to secure an effective natural system (Gall, 1835a, pp. 162–163). Even though he had fallen into disfavor with the Catholic Church, it persisted to be a common motif in Gall's arguments that

> God has traced for [man] the circle in which he must act, and has directed his steps. It is for this reason that at all times, and among all nations, man presents

> the same essential qualities of which he could not have conceived the idea, without the predetermination of the Creator. (Gall, 1835a, p. 104)[11]

If we trust his words, this means that Gall believed in a divine exterior force of creation that had constructed the blueprint of the brains of all beings. As a consequence, the species and role models in the world were supposed to live on as manifestations of this predesigned and unchanging master plan. This concept of intentionally created differences between and within species disabled and disallowed female emancipation as well as male/female convergence. Gall sometimes referred to the cause of predetermined sexed constitution as a divine creator and sometimes as a natural force (Gall, 1806b, p. 84; Lesky, 1970, pp. 307–311; van Wyhe, 2002, pp. 40–41).[12] However confusing this is, at least at an early stage in his work, Gall referred clearly to a metaphysical power named God that directed minds and bodies naturally via the composition of the organs in their brains (Gall, 1791, pp. 163–165).

There is one additional puzzling instance regarding Gall's view of the origins of sex/gender differences: his rather constructivist depiction of sex as an exterior force from outside of the body. This notion can be found in several similar passages in which he stated that just as to the stars, the climate, and the seasons of the year, their environment, education, religion, nourishment, or age, humans were *exposed* to sex (e.g., Walther, 1804, pp. 37–38; Gall, 1808; Gall & Spurzheim, 1811, pp. 161–162). He states it "had an effect on them" (Gall, 1791, p. 2), meaning that dynamics in these matters modified the brain and its functions, the "desires, propensities, passions, and ultimately, the motives and determinations" of humans (Gall, 1835f, p. 272). It is perplexing that the lists contain sex as an external influence on humans since Gall did not believe in the possibility of variations of the sex of people—as would be possible with a diet, for instance—or in a continuously developing sex similar to age. Rather, I have shown that he considered transgender people mentally ill and dichotomic sex differences to be innate even prenatally.

Moreover, Gall used his view of the impact of an unchanging sex on human constitution as an argument for the truth of his organology: if there existed any *metaphysical* laws for the nature of human beings, he argued, they would be the same for all of them and would not differ in beings of different sex, age, or nourishment. Yet, because he had shown that human minds and characters depended on these matters to a strong degree, he concluded, there had to be a *material* predisposition to differences in individuals—including masculinity and femininity—which could only be unraveled physiologically (Gall, 1835a, pp. 61–62). Contrary to his intention, this leads back to where Gall started his argument: to a creative *metaphysical* authority predetermining sex/gender roles and characteristics by making use of specific organizations of brain tissue and functions. This leaves no room for a constructivist view of sex/gender as a performative power on existing beings as implied in the quote above. The contradiction points to an instance of conflict between Gall's naturalistic ideas about human nature and his internalized acceptance of a dichotomic sex/gender concept.

[11] See also Gall (1791, pp. 46, 163–165, 1835a, p. 164, 1835f, p. 310), Gall, Vimont, & Broussais, (1838, p. 29), Temkin (1947, pp. 300–306), Ackerknecht and Vallois, 1956, p. 20, and Tomlinson (2005, p. 63).

[12] On the unclear demarcation between the *natural* and the *divine* in Romantic thought and its influence on scientific reasoning, see Lovejoy (1936).

Conclusion

Let me condense Gall's metaphysical-naturalistic approach to sex/gender[13]:

1. Male and female humans and animals *differ obviously* according to physical and inward characteristics.
2. These differences can only be *explained by the composition of material organs* in their brains that are attached to specific functions. Some of the organs are more perfect in one sex than in the other even though the underlying structure is identical.
3. The *ultimate reason* for the dissimilarities, however, lies on a metaphysical level and is specified as a *force of nature* designed by a divine creation to secure contentment and propagation of living beings on earth.
4. To accomplish this order, there exist *specific profiles for females and males* concerning mind and body. These are necessary to secure a successful cohabitation. Education and social order follow these rules, not the other way round.
5. Because humans are the most complex part of creation, many *modifications and exceptions* from the general rules are possible. Yet, they occur too rarely to put an end to the natural order.
6. Since all of the faculties are innate, they cannot be changed fundamentally, and brains are reset to their inherited basic organization with every new generation. In particular, if a deviating individual has acquired abilities belonging to the other sex by accident or training, these will not be passed on. Modifications of the outcome of the allocated organs are possible in individuals, but the *natural order will not change*.

Gall did not try to deduce or legitimize dichotomous sex/gender relations scientifically. Instead, he used his idea of science to make apparently divine principles comprehensible in a physiological language. This way, he naturalized the *implementation* of the differentiation between female and male, but not the *installment* of these categories. Gall's acceptance of manifold exceptions to this perceived rule would have made it, on the one hand, very hard to furnish him with counterevidence against a dichotomous creation. On the other hand, because he held the view of a fundamentally similar constitution of males and females, his system might have collapsed easily if he had realized that, besides his experiences, there were other possible orders of society that guaranteed contentedness of the participating individuals as well as propagation of the species.

As I have pointed out, Gall did not succeed in carrying out unbiased empirical science, but he cannot be called a noteworthy misogynist judged by the standards of his time. To the contrary, he was a researcher who adapted contemporary prejudices in a scientific system without preventing—or perhaps even noticing—that they led to circular arguments that weakened his whole system and made it anything but naturalistic. Thus, Gall's epistemology was more defective than his methodology: he used the latter to get from a starting point of his investigations (an *observed* and, in his eyes, epistemologically certain male/female dichotomy) to the target (an *explained* and localized male/female dichotomy).

Gall's theoretical accounts of dichotomous sex/gender relations and inferior females exceeded his efforts for women's rights and sex/gender equality. Nevertheless, the evidence presented here shows that any presentation of him as an outstanding misogynist with regard to his sex/gender constructs would be inaccurate. Further research could concentrate on archival sources to sharpen the representation of Gall's actual scientific practice in palpating skulls and choosing objects for his investigations. These sources would offer additional

[13]These ideas were concisely developed in Gall and Spurzheim (1811, pp. 34–36). English translations of many of the ideas can be found in Gall (1835a, pp. 182–183, 1835d, pp. 229–232).

insight in his sex/gender concept. Disentangling Gall's attitude towards sex/gender and contrasting it with the conceptions of his direct and indirect successors in phrenology and the neurosciences could help to reveal which parts of Gall's theories and practices involving sex/gender were specific to brain research, and which were mere scientific reflections of the contemporary social order. Finally, various source-based investigations could help trace more recent developments in the scientific treatment of sex/gender to their origins and scent biases in knowledge production that may have been handed down for centuries.

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