

Chapter 5: *Heart and Science*

By the 1880s Collins is urgent to re-unite discourses between the arts and sciences, now, in his view, dangerously competitive. His worry is shared in *Blackwood's* article, "Paradise of Birds" (163), and the relevance of the issue is also indicated when contentions are aired in a review of Huxley's *Lay Sermons, Addresses, and Reviews* (1870) where Huxley is quoted:

'The man who shall know the true history of the bit of chalk ... is likely to have a truer, and therefore a better conception of this wonderful universe, and of man's relation to it, than the most learned student who is deep read in the records of humanity and ignorant of those of nature.' ("New Books" Jan. 1871, 614)

The reviewer's response asks whether dry bones or a piece of chalk can

interest men and instruct them, and illuminate the universe for them, as do the vast stores of human experience, the records of toil, love, and sorrow, the struggle upward of their own race? (615)

Heart and Science warns how extreme rationality and detachment can distort human nature that needs faith and fictions to respond to the variety of life's opportunities. The novel is not a debate between heart and science -- though sometimes it is critical of the multiplication of debates within science. Rather it builds a case for reconciling the arts and sciences, on the understanding that a healthy mind--and a healthy culture--depends on the development of both emotional and rational capacities. The idea is not new in Collins' work but the urgency with which he expresses it in the later novel reflects an increasing anxiety that creative, non-rational aspects of western culture are being eroded by an exaggerated faith in scientific discovery, at growing cost to the humanitarian values of the society. *Heart and Science* warns that intellectual life can be restricted by specialisation in the sciences, so narrowly focussed as to neglect the subjective life of the psyche. Collins targets vivisection as the topical manifestation of this division.

Both Lansbury and Farmer have outlined the anti-vivisectionist controversy that seized Britain in the 1870s and that forms a background for Collins' novel of 1883. My study draws on their research. The first part of my analysis of *Heart and Science* is concerned with how contemporary arguments against vivisection are worked through in the novel. Because Collins makes his vivisector another Faustus, I look at the way Collins uses the anti-vivisectionist debate--to which he is committed¹--to raise even broader epistemological, moral and sociological issues relevant in the second half of the nineteenth century.

The novel has a dual emphasis: "heart" represents the sensitive core of emotional feeling and thoughtful understanding that characterises humanity and is the province of art; "science" signifies a trained faculty of reasoning, distinct from feeling, and a depersonalised cleverness for amassing information. By Collins' account these two capacities are interdependent. One without the other is ineffectual. The duality that the title announces was made clear symbolically in the original cover design for the novel where ivy linked a heart and an owl (*Letters* 457). The debate Collins engages with is between the moral and immoral methods of experimental science, shown, in the later chapters, extending into medical practice. The novel attacks not science *per se* but the excesses of science insufficiently regulated by ethical principles, and narrowing specialisation that loses its humanitarian focus. Thus Collins set his novel in direct opposition to research scientists like Professor Cyon² who argued that

¹ Much earlier Collins' own affection for his pets and abhorrence of cruelty to animals is registered in his correspondence (e.g. *Letters* 2.293 and 1.113). An affection and concern for animals is frequently expressed in his fiction, too, and well before the release of *Heart and Science*. For example, in *The Woman in White* Marian's concern for the wounded spaniel is contrasted to Percival's lashing out at his dogs and a Newfoundland helps establish the happy domestic setting of the Joyce family in *Hide and Seek*.

²-- A continental physiologist who complained that his book describing the methods of physiological research had been misrepresented in England by anti-vivisectionist campaigners.

science was above any law enacted by a government influenced by “outsiders whose judgment has no value at all in matters of science (499). He argued for the *right* of scientists to experiment (505) and saw English physiologists, subject to policing regulation as being insulted and humiliated by English law (500). Collins’ Benjulia is recorded as sharing these views:

“Knowledge is its own justification and its own reward. The roaring mob follow us with its cry of Cruelty. We pity their ignorance. Knowledge sanctifies cruelty.” (190)

Collins does not separate science from morality and accepts that his readers, albeit “outsiders” to science, share, with physiologists, an equal right *on moral grounds* to prohibit torture--regardless of potential discoveries science might make. So he presents Benjulia’s ideas in diction carrying a moral charge. “Pity” is weighed against “Cruelty.” Benjulia is made to use “justification” and “sanctity,” words with Christian connotation, and inconsistent with his argument, so that his qualification to distinguish ignorance from knowledge is also to be questioned. An air of superiority is suggested by his derogatory use of “mob.” While Benjulia sees himself as a “reformer,” Collins’ account reveals the deformity of his character and his goals.

While the controversy over vivisection raged, even violently at times, Collins preferred a more controlled approach to campaigning. He had admired the combination of “forcible statement” and “moderation of judgment” in Frances Power Cobbe’s Address, a copy of which she had sent to him³. These are the same qualities Collins brings to his novel. In correspondence to her, Collins promised to avoid the excesses of both sides in the controversy (Cobbe *Life* 184). Nevertheless, his opposition to

³ Frances Cobbe was a leading campaigner and publicist for the antivivisectionist cause. Collins had contacted her for information and received, in return, a number of pamphlets, including the Address, as his return correspondence records. (Cobbe, *Life* 184)

vivisection is unequivocal. In parts it is argued with a logic that remains relevant.⁴

Collins' argument against vivisection is supported with dramatic demonstration through details of the fiction. First there is an inconsistency indicated by Benjulia's secrecy and disguise. If Benjulia's experiments are legitimate, why are they secret and vaguely referred to as "chemical"? If his motives are humanitarian and innocent, why are they walled in, "enclosed" behind an "iron gate" at the end of a "lonely lane"(129)? Such emotionally charged details in the physical description of Benjulia's premises negate the reader's trust and imply base motives for illicit activities pursued there. Within, even Benjulia's journal is "a shabby-looking book, guarded by a lock" (132). And Benjulia is evasive: when Ovid Vere questions him about a moaning sound he has heard nearby, Benjulia dismisses the sound as wind in the trees (134). It seems that Collins shares the views of a correspondent to the *Morning Post* who had argued that to destroy the secrecy surrounding cruel animal experimentation was the best way to stamp out the practice (Hoggan 339). In contrast, Cyon argued that secrecy surrounding physiological research was the result of legal interference (499). Collins' argument against such a view is reinforced by emphasising the openness of Ovid Vere and the Canadian, Morpew, who, far from keeping secrets, are generous with their information and urgent in publishing findings to reach the widest

⁴ For instance, the ABC's 7.00 pm television news (27-8-02) has aired an allegation that a leading professor, actively promoting embryonic stem cell research, has misled politicians to sway their votes. The restoration of some movement in a crippled rat, demonstrated in videos shown to politicians, is represented as resulting from the growth of *embryonic stem* cells, while, it is alleged, the benefit was achieved with the use of *older germ* cells. The twenty first century scientist, like the fictional nineteenth century physiologist, is reported to be talking up his research to exaggerate potential benefits from ethically questionable practices. Now, as in the past, the debate is polarising opinion and the matter of openness in scientific disclosure is being considered.

possible readership for the greatest medical utility.⁵

The uselessness of Benjulia's scientific method is demonstrated by comparison with the practices of the unnamed mulatto, Morphew, and Ovid Vere, each of whom stresses the experience to be gained from bedside care (307). "Ovid had forestalled [Benjulia] in the discovery to which he had devoted his life" (320) not by repetitious experiment, as practised by the physiologist, but by daring adaptation (310) of a treatment outlined by the mulatto who relied on observation and post-mortem examination of the human subject to deduce a new means of treating brain disease (308). As anti-vivisectionists argued, information gained from animal experimentation would not necessarily be relevant for humans. Morphew's letter makes the same point and Lemuel taunts his brother with it, quoting the doctor as authority:

"I should also like to ask what proof there is that the effect of a poison on an animal may be trusted to inform us, with certainty, of the effect of the same poison on a man. To quote two instances only which justify doubt--and to take birds this time, by way of a change--a pigeon will swallow opium enough to kill a man, and will not be in the least affected by it; and parsley, which is an innocent herb in the stomach of a human being, is deadly poison to a parrot." (189)

The debate here is between two scientists who are using scientific methodology to establish the truth of the case. The burden of proof rests upon specific evidence. But that evidence must relate to human subjects. In the case Morphew contests, physiologists, relying on the results of animal experimentation, expect it to be taken on trust that their research will apply to humans. It is an unreliable expectation, seriously compromised by evidence which Morphew advances and that justifies doubting the physiologists' claims. Morphew's letter continues:

"I should deal in the same way, with the other pretence, of improving our practice of surgery by experiment on living animals.

"Not long since, I saw the diseased leg of a dog cut off at the hip joint. When the limb was removed, not a single vessel bled. Try the same

⁵--A nice point at the time since Collins' agent, Watt, was engaged in extending readership of Collins' work through a syndicate of British provincial newspapers (Law ch4.2).

operation on a man--and twelve or fifteen vessels must be tied as a matter of absolute necessity." (189)

By demonstrating the difference between the animal and human subject Morpew rationally dissociates the practice of vivisection from any likely gains to human surgery and exposes as pretence, in consequence, the claims of vivisectionists that they are pursuing an humanitarian cause. Moreover, Collins has already demonstrated Benjulia's lack of concern for the welfare of patients when, in reply to Ovid's enquiry about the progress of his work, he has Benjulia exclaim, "Damn the world!" (101). Like Mrs Gallilee and Le Frank, Benjulia is a pretender and the phoniness of his objectives is registered in his parting conversation with Ovid:

"A last word of advice," he said. "You are travelling for your health; don't let inquisitive strangers lead you into talk. Some of them might be physiologists."

"And might suggest new ideas," Ovid rejoined, determined to make him speak out this time.

Benjulia nodded, in perfect agreement with his guest's view.

"Are you afraid of new ideas?" Ovid went on.

"Perhaps I am--in *your* head." (134)

Collins' depiction of Benjulia's jealous attempt to forestall Ovid's potential breakthrough in research illustrates the argument of antivivisectionists who held that those practising vivisection were interested only in competitive advantage:

The idea of the good of humanity was simply out of the question, and would have been laughed at, the great aim being to keep up with, or get ahead of, one's contemporaries in science, even at the price of an incalculable amount of torture needlessly and iniquitously inflicted on the poor animals (Hoggan 340).

While Benjulia is shown jealously struggling to make himself famous by illegal and cruel means, Collins is silently and ironically dismissing his quest for fame by giving credit for the discovery Benjulia sought to an obscure and unnamed mulatto.⁶ It is noticeable, however, that Collins does not disparage ambition *per se*. Through the remarks of Sir Richard

⁶The mulatto is another Ezra Jennings, but different from that character in one important aspect: his work is passed on to advantage others, not buried and lost with his death.

(in chapter 2) Ovid Vere is also shown to be ambitious. But he is modest where Benjulia is vain. It is the mixture of ambition with pride that makes Benjulia dangerous. And his arrogance is made illustrative of the boastful claims of science for "knowledge" and "truth."

Collins' argument against vivisection is given the effect of authority because he has not left Lemuel, a layman, to debate his scientific brother. Instead he has circumvented the argument of researchers (that the layman is unqualified to have an opinion in matters of science) and has pitted two scientists against each other, to speak in the language of science. Significantly, both are biologists, but each represents a different branch of that emerging science. Benjulia is a physiologist, committed to experimental methods; Morpew--his name is the clue--is a morphologist, pursuing the science of forms and structures that takes account of both the anatomy of the body and the development of the soul.⁷ That is, Morpew is the spokesperson for what Collins' title represents, heart in science, and it is Morpew's concern for the loneliness of a destitute and dying man that leads Ovid to offer to go to his relief. And while Benjulia's experiments aim to locate the typical, Morpew's practice stresses the multiplicity of variation that evolutionary theory recognises--as his examples quoted above illustrate. Morpew, then, is to be seen as representing a new professional scientist who still holds humanitarian and moral values. Like Ovid's, his work is altruistic and non-discriminatory, serving real needs, not theoretical goals.

Collins also figures the uselessness of Benjulia's "research" in the description of his workplace. The emptiness of the spaces surrounding the laboratory suggests disconnection. Benjulia's private rooms are "barren," the floor "bare" (130). There is "but little furniture," no curtains, no

⁷Burden-Sanderson draws these historical distinctions (274).

pictures, no colour and an empty grate (131). Even his manservant “has nothing to say” (130). The compound of negatives suggests the worthlessness of Benjulia’s unnatural “work.” And Benjulia himself seems dwarfed by the negative space surrounding him for, although Benjulia is described initially as well above average height, almost a giant (94), he appears, simultaneously, as gaunt and a “living skeleton” (95), inhabiting clothes too big for him, and so as somewhat less of a man. He is distinguished by an “unnatural” mismatch of physical features--suggesting perhaps an equivalence with a despised mongrel--at odds with his pursuit of power and his delusory ambition that ends in pathological breakdown. The description of Benjulia’s hands is used to suggest that he is a throwback, for, although his fingers have all the dexterity of the human animal so that “when he wished to be careful, he could handle the frailest objects with the most exquisite delicacy” (95), nevertheless the nails are primitive, amber-coloured, on fingers turned up at the tips.

Generally (Benjulia and Null are exceptions), Collins shows his respect for doctors, depicting the surgeons, Ovid Vere and Morpew, as heroes, dedicated to merciful healing, by the 1880s no longer the butchers or barbers of earlier⁸ times and reflecting the advances in medical science since the 1830s. Their decency is demonstrated in their anti-vivisectionist stand and humanitarian concern, not merely by their hard work and competence. Though these latter criteria may be accepted as standards of decency by a naive readership who might be influenced by Smiles’ view that energy defines a man’s character (Houghton 117), Collins shows that they are insufficient attributes to earn social regard for even Benjulia can

⁸ In 1841 “The World of London” describes the city neighbourhoods: public, private and professional. Part 3 of the series sets the College of Physicians between the dust heaps and military barracks and makes little distinction between doctor and chemist and chemist and publican. Part 6 refers to the “Dirty Dicks of Science” (480) and includes doctors in that number.

claim these. People worthy of esteem, he points out, show respect for others and don't resort to violence and cruelties; they are kind. Repeatedly, by contrasting Benjulia and Ovid, Mrs and Mr Gallilee, Null and Mool, Le Frank and Frances Minerva, Collins equates social merit with kindness--just as he had done years earlier in his portrayal of Valentine Blyth. Among medical professionals, he demonstrates, nowadays it is not the surgeon who warrants distrust but the physiologist, that specialist scientist with misplaced energy, dedicated to dissection at any cost, and Null, the incompetent relic of an earlier time who jealously secures his income with repeated, but ineffectual, house-calls. Null's vanity leads him to seek kudos by associating with the specialist and he fawns on Benjulia. But Null is, as his name suggests, negligible, and Collins classifies him bathetically as sub-human: Null submits "to the force of events as a cabbage-leaf submits to the teeth of a rabbit" (297).

Collins' depiction of Null, Ovid and Benjulia provides not only a fictional range of characters but also an historical overview of the rapid changes that had been occurring in medicine after 1830 and especially in the period 1845-1860. Looking back, in 1893 Burden-Sanderson pointed out how with knowledge of the process of cell-development and growth, pathology had become part of physiology and "secured its subsequent progress and its influence on practical medicine" (281). In line with that development, as early as *Basil*, Collins was already making reference to "the different theories of infection" (282). In *Heart and Science* Null works selfishly for his bread and has failed to keep pace with developments. Ovid, with money from his late father, has no need to work hard but does so altruistically and represents the new professional, alert to methods, old and new, and (again consistent with Burden-Sanderson's historical overview) with "that capacity for discovering the remote cause of disease"

(480). He represents the growing status of the surgeon that is reflected in the initial praise by the physician, Sir Richard, and in Ovid's association with his professional body, the College of Surgeons. Benjulia, the physiologist, represents the excesses of experimentation.

Like Lewis Carroll, Collins does not distinguish the pain an animal suffers from the pain experienced by a human animal:

For does it [i.e. the infliction of animal pain] not presuppose the axiom that human and animal suffering differ *in kind* ? A strange assertion this, from the lips of people who tell us that man is twin-brother to the monkey!(Carroll 343)

Collins makes the same point from the opposite direction. Zoe (affectionately known as Zo) registers her affection for her father in a cat-like action, rubbing her head against his hand (65). The action is unconscious, but it aligns Zoe with the animal world. To the child the family terrier is a pet and playful companion. To her mother the dog is an expendable nuisance, kept at present as a status symbol. Similarly, the abandoned cat that Ovid takes into his affectionate care becomes, in Mrs Gallilee's mind, simply a bargaining tool to manage her son. The way people treat their pets becomes an indicator of their characters and a sign by which to predict their actions. Two generations after "Humanity Martin" had been ridiculed in the Commons for trying to persuade parliament to forbid cruel sports Collins can write in confident expectation that his readers will recognise cruelty to animals as social deviance. Neglectful cat owners are described as "barbarous"(82) and undeserving of the companionship either of their pets or their fellows. This value system is shown to cross class lines--as the incident with the maimed dog illustrates. Notice the priority that Benjulia's servant observes in carrying out his job:

First giving the dog a refuge in the kitchen, the footman--rigidly performing his last duties--went to close the gate. (334)

Contrary to the belief that Britons were kind to animals, daily reports to the R.S.P.C.A. suggested that this view was idealistic. Realistically, Mrs Gallilee's abuse is not an isolated case. Nevertheless, Collins upholds the ideal that pets are part of the family, offering devoted companionship and love: to harm a pet is like harming a member of the family. So, when Collins represents Mrs Gallilee contemplating disposing of the family pets, he is also creating suspense by preparing readers to expect a threat to Carmina.

A heavy irony is reserved for the depiction of Benjulia's inconsistency. The vivisector who can inflict pain mercilessly on others does not bear pain patiently himself. When Ovid calls, the torturer of animals is preoccupied by the pain of his gouty foot and rudely dismisses his guest. In this way his "sensitivity" is shown to be merely physical, not moral, and only selfishly directed and then only to a foot, remote and dissociated from head and heart (134). Ultimately, too, there is the suggestion that the physiologist, who denied the relief of anaesthetics to the victims of his experiments, when facing a painful death, before setting the laboratory and himself on fire, uses opium to relieve his suffering.

In contrast, Carmina is shown to be distressed by the plight of a stray dog that, by "mysterious insight," is drawn to follow her: "Carmina's gentle heart gave its pity to this lost and hungry fellow-creature" (57). When it is run down and killed she becomes physically ill as its trauma is absorbed into her own person. The poignancy of the event emerges less in the accidental death of the dog and more in the reader's realisation that the experiences of its life had left it "accustomed to kicks and curses" and so frightened by unfamiliar kindness that it darted into the road where it was run down (57). This early episode also demonstrates Carmina's susceptibility to deep feeling that leaves her vulnerable to abuse, and

accounts for the partial catalepsy she suffers later from her aunt's cruel mistreatment.

Collins had promised from the outset, in his letter to Frances Cobbe, to "leave the detestable cruelties of the laboratory to be merely inferred" (Cobbe, *Life* 185) and he points out in his Preface to Readers in General:

You are purposely left in ignorance of the hideous secrets of Vivisection. The outside of the laboratory is a necessary object in my landscape--but I never once open the door and invite you to look in (38).

Furthermore, in outlining the "Belt-and-Braces" serialisation of *Heart and Science*, Steve Farmer and Graham Law have explained that in planning syndication, "the initial approaches all took virtually the same form, among other things assuring editors (rather dishonestly, given the cause it advocated) that the new novel would not concern 'painful social subjects' " (*Wilkie Collins Society Journal* 2. 65). In fact Collins does practise a degree of moderation for his examples of cruelty are few and less extreme than cases reported by activists, the R.S.P.C.A., and in the press. (Multiple examples have been collected by Ritvo (e.g. 126 et seq.) and Lansbury (e.g. 25,35,125,171). In his letter to Frances Cobbe, Collins makes clear his view that excess, no matter how well-intentioned, is counter-productive (Cobbe, *Life* 184). This is as true for the serious novelist as for the antivivisectionist campaigner. So it may be to both artistic and practical ends that he aims to be seen to be avoiding details that will cause readers distress and revulsion, or will tempt editors to tamper with his copy. He would understand that readers might already have been exposed to reports of brutalities through the newspapers, cases brought before the courts, and pamphlets distributed by activists. Such familiarity would need only a trigger to bring details back to mind. So instead of risking an extreme reaction from his readers--their becoming either blase (from repeated exposure) or traumatised (by excess)--Collins uses their memories

and the associations of language to suggest the horrors of Benjulia's laboratory by recording the sound of whimpers and moans and the sight of Benjulia's blood-stained stick and hands (185).⁹ Nevertheless, Lemuel is permitted to make short reference to some extreme cases such as those listed by Frances Power Cobbe ("Vivisection" 361). Assuming the dog's point of view, Lemuel accuses his brother: "Fie upon the cruel hands that bore holes in our head and use saws on our backs"(186). More examples follow as Lemuel reads from Morphew's letter that adds, "I can multiply such examples as these by hundreds." Even here, where Collins seems to be following the undertaking he had given, he makes it clear that he is disgusted by the indiscriminate scope of the practice--like the Lord Chief Justice, who wrote:

it really is not experiment to verify or disprove theory, which one well-conducted and crucial experiment might do, but experiment *in vacuo*, experiment on the chance, experiment in pursuit of nothing in particular, but of anything which may turn up in the course of a hundred thousand vivisections ... (Coleridge 353)

Heart and Science hangs on the improbable co-incidence of the dying mulatto passing on his knowledge to Ovid Vere. The improbability of that fictional coincidence is no different from the improbable likelihood of a chance discovery being made in science, a possibility Collins readily accepts and demonstrates in the example of Carmina's treatment. What his story does not approve is the practice of multiple and unnecessarily repeated tortures on the off-chance that a discovery may eventuate. So Collins finds expression for the torment of the laboratory.

Pain is expressed metaphorically in the penetrating shrieking

⁹ Presumably Collins was thinking of his *Belgravia* readers when he claimed to know his audience well (Cobbe 185) but it would appear, when *Heart and Science* was released in the country press, that he had reservations about the tastes of the new readership, who found his work too literary and highbrow. Apparently, to Collins' disdain, they expected a more sensational telling (Law 173-74). Law quotes from a letter by a provincial editor who declines to accept the novel on these grounds and concludes it is in his paper's interest to accept instead a cheaper and artistically inferior tale. (Law 5.2)

scream of the railway whistle heard by Benjulia near the end of the novel (322,323). That symbol advances the anti-vivisectionist cause but it also widens the argument to include the maiming of the countryside by railway development that is a correlative of urbanisation and city life, that province of "merciless straight-walkers whose time is money, and whose destiny is business" (50-51). The dreary, modern railway hotel, product of technological progress, is similarly shown to be without "heart" and is unwelcoming to visitors (52). In his correspondence Collins expressed his personal dislike of railway travel (*Letters* 1. 216). But in these references from the novel it seems he is bemoaning modernisation in general and associating vivisection with it as part of a trend.¹⁰ The metaphorical link between urban landscape and disruption is repeated where the quiet, open space of the Square serves as an escape for Mr Gallilee, and Ovid, tense and ill, seeks relief by walking into the country.

Nevertheless, Collins does not idealise country life. The story of Carmina's father, Robert Graywell, includes a rejection of blood sports. Hunting in various forms is described as "stupid and cruel" (72). In fact, cruel, wasteful destruction in all its forms is shown to be offensive. Collins does not confine the opposition to animal cruelty to hunters and vivisectionists. Stray dogs (57), poisoned cats (126), caged animals (105)--these cases, too, are brought to the readers' attention.

The episode at Regents Park questions whether the keeping of animals in zoos can be justified. By juxtaposing feeding the cranes with the governess' attempted lecture on the birds' migratory habit (93) Collins sums up what are generally perceived to be the dual functions of the zoo: entertainment and teaching. However, the educational and scientific

¹⁰ It seems that a parallel is to be inferred: society's emphasis on commodities leaves no place for art; just as the vivisectionist's preoccupation with work has no room for compassion.

value of zoos is challenged because the interest in natural history is shown to be selective. Commonplace creatures are undervalued while the exotic animals, like monkeys and apes, are valued as curiosities, acquisitions in a lengthening catalogue. Harriet Ritvo has argued that keeping animals from around the world was emblematic of Britain's imperial power and prestige (Ritvo 230). As a site expressive of imperial power, the zoo is thus a particularly appropriate setting for the illustration of Benjulia's authority and influence. Certainly, Benjulia's interest is in rarities, considered as specimens, and in potential subjects for dissection (99,103), both of which are part of his quest for intellectual control over nature.¹¹

By contrast, humanitarian concerns connected with zoo management are raised. The smell at the monkeys' cage that affronts Carmina implies that they are kept in unsanitary conditions. When Benjulia worries that the cold will kill the sick monkey before it reaches his laboratory this detail reminds readers how the life span of imported creatures typically was shortened by London's climate--despite the temperature-regulated cages of which Maria boasts (104). Chiefly, though, the debate over the justice of keeping animals in zoos is worked out in the exchange between Teresa and Maria: Maria rehearses the standardised descriptions of animals given in guidebooks and animal texts; Teresa, who regards Maria's science as "gibberish" (105), finds it immoral to take animals out of their own countries and imprison them in cages. She is impatient with Maria's glib and unsympathetic response to her reflections and resists the child's air of

¹¹ Similarly, as part of her lecture on Canada (128) Mrs Gallilee boasts that science will eventually dominate even the force of Niagara. Referring to the "number of gallons of water wasted every hour by the falls of Niagara," Mrs Gallilee remarks, "Science will set it all right, my dears; we shall make that idle water work for us, one of these days" (128). The satirical tone in the context of those remarks indicates that Collins is ridiculing enthusiasts, like Mrs Gallilee, who pin their hopes on science to dominate nature. However, given the engineering works that had brought water to cities like Glasgow and Liverpool, perhaps his satire was misplaced. In 1861, Fairbairn spoke of bringing water from Wales to London at a cost of seven million pounds, a "gigantic" task but at such a manageable cost not necessarily "problematical" (154).

superiority by declining to enter the monkey enclosure. Collins' words provide a variation of Ritvo's argument that humanitarian concern for animals became a metaphor for class struggle when an aged servant uses her concern for the monkeys as the means to challenge her social superior and junior (105). However, Teresa is no sentimentalist and animal husbandry is not her target. The monkey, she has heard, does not make good meat and for that reason she finds no cause to confine it.

When Teresa claims to speak as a Christian, one who "can't be expected to care about beasts"(105) it comes as a surprise when it is she who defends animal rights. In a nice inversion of the tendency to "elevate" animal behaviour by representing it in human terms, Teresa finds monkeys' "innocent" behaviour sometimes superior to that of some humans and equally deserving of humane and just treatment.¹² So she defends animal rights on moral grounds and in defiance of Maria's "scientific" learning. It is simple Teresa who points out the irrationality of evolutionists' behaviour towards animals: while they accept the theory of common descent, they abuse their kinship by confining animals as if they were criminals. On the other hand, Teresa's approach is sympathetic and serves as a model for Collins' readers. At the monkey enclosure she wonders, "How do they like it?" and "I want to know how the monkeys amuse themselves in that large house?" Her quest for information focusses on the creature's welfare, not its anatomy.

The value Collins places on all forms of life is affirmed when Zoe is attracted to "the most amusing bird in the Gardens--the low comedian of the feathered race--otherwise known as the Piping Crow" (91). There is something distinctive and valuable, Collins shows, to be found in the

¹² Her view would seem to be a tilt against Darwinians who, while maintaining that the difference between humans and animals was a difference only in degree, not type, also maintained that, of all the differences between men and the lower animals, the moral sense of conscience was by far the most important (de Beer 213).

commonplace--a point entirely lost on Benjulia. When Ovid expresses alarm at Benjulia's obliviousness to the beetle he treads on, the episode (103) demonstrates the gulf that exists between a doctor and a physiologist: the one a preserver of life; the other, a collector of specimens.¹³ Moreover, these two examples distinguish Collins from people who oppose vivisection to animals at the top of a hierarchical classification. For Collins, such a distinction is irrelevant because the campaign operates from a moral position according to which no deliberate pain is justifiable. Though the law, after the Commission of 1875-76 and under the Cruelty to Animals Act, still permitted vivisection by licensed physiologists, Collins argues with the antivivisectionists that knowledge obtained through experimental torture is outside the limits of lawful knowledge because it has been immorally obtained.

As Carmina's story demonstrates, pain is not necessarily physical. Emotional trauma, deliberately created by whatever devious logic, is also painful and can be cruel. And her case of deliberate neglect projects the fear that "logic might now and then prove too much for morals" (Coleridge 354) and that the vivisectionist might turn next to a human subject for experimentation. He cites the case of a Dr Tom Robinson who delayed treatment of a patient "in order that the students at the hospital might witness the case" (354). Lansbury refers to the case, in 1883, of Murrell and Ringer to demonstrate that "many doctors did indeed regard their right to research as being more important than the care of patients"

¹³ Why a beetle? Why not some other creature tiny and so considered insignificant? The Victorians' passion for collecting seems to have begun with insects and gone on to include moss, lichen, corals, ferns, protozoa etc. *Both* Wallace and Darwin were *first* interested in beetles, Darwin while he was at Cambridge and Wallace while working as a surveyor in Leicester. Not only was collecting part of the popular culture but it reflected the "scientific" side of a popular hobby. In *The Moonstone* Betteridge is made to express his disdain for "gentlefolk" who collect insect specimens -- an earlier sign of Collins' genuine commitment to animal welfare (51).

(Lansbury 59). Here are two models for Benjulia's failure to treat Carmina "--for Knowledge"(307).

Collins has well prepared his readers for Benjulia's "progression" to human experimentation. Much of the tension in the novel results from anticipating this outcome and I have already noted Mrs Gallilee's threat to family pets as forewarning a threat to Carmina. More subtle associations build that threat. For instance, readers are led to share Carmina's own apprehension: "As she crossed the hall her thoughts took a new direction. Some indefinable distrust of the coming time got possession of her" (198). When she catches sight of "an ugly model of the Colosseum, in cork" standing on the hall table (199), unconsciously *her* thoughts turn to Italy and Teresa but, given the lead-in of "indefinable distrust," the model also recalls the function of the original as a site for blood sports and human sacrifice.¹⁴ A cork model, in miniature, of a classical subject, of itself is perhaps just another status object or curio and an example of the Victorians' attraction to miniatures. The significance for readers is that Mrs Gallilee is shown to choose for her model a place where the slaughter of wild beasts was a popular spectacle. (By some accounts five thousand were killed on the opening day.) Mrs Gallilee's model has a London equivalent too. According to Ritvo (212), at the zoo a diorama, representing the Roman Colosseum, was a "frivolous diversion" for casual visitors and quite separate from the "scientific enclave" where, behind heavy iron gates, serious study of the collection occurred. With this in mind, Mrs Gallilee's home model betrays her merely as an idle spectator. Despite her "studies" into the nourishment of tadpoles, she is

¹⁴ The Colosseum belonged to the reigns of Vespasian and Titus, a time of great wealth and building and empire, but a time lacking the great literary artists of earlier times. Perhaps Collins was registering a parallel with his own times when it seemed that Science was supplanting the Arts. Although this suggestion may seem tenuous today, to readers with classical backgrounds, like Collins' contemporaries, I believe it would hold force. Moreover, it links culture and expansion as does the thesis of Collins' novel.

no true zoologist.

Benjulia has a foreign-sounding name. His appearance is exotic, a crossbred assemblage of contrasts. He boasts of having been “everywhere” (100) and his contacts in Italy and Canada seem to support his claim. These details appear to invoke stereotypes concerning foreign “excesses” and to support the delusion that English vivisectionist practices are less horrible than those practised in foreign parts. The documents Farmer has collected, especially in appendix B4, suggest that there were attempts to dissociate British experiments from continental cruelties, and Ritvo claims:

as early as the 1830s, despite the circumambient evidence to the contrary, the English humane movement had begun to claim kindness to animals as a national trait and to associate cruelty to animals with foreigners, especially those from Southern, Catholic countries (127)

Collins upsets the myth of British humanitarianism and, like Cobbe, recognises the myth as a deception (189). So the “English Savage” with a foreign name avows, “ ‘I do it [vivisection] because I like it,’ ” and, like Cyon, (Cyon 499), expresses contempt for public opinion (190). Not only does Benjulia assert the authority of his science over public opinion but he also further admits, “ ‘if I could steal a living man without being found out, I would tie him to my table, and grasp my grand discovery in days’ ” (190). So Collins puts aside any wishful thought that the English vivisectionist is less of a savage than his foreign counterpart.

In the debate between Benjulia and his brother, Lemuel is shown to prevail. What makes the result telling is that Lemuel, whose character is described as “unenviable “ (184) and whose reputation is questionable, still retains sufficient humanity to be ashamed of Benjulia. And although Lemuel is regarded by his brother as little better than a fool, in arguing a point of law (188), he leaves his “clever” sibling without an answer. It should be noted that Lemuel asks the difficult questions but it is Benjulia’s

logically reasoning mind that demonstrates that there is no morally right answer available from scientific reasoning. Logic cannot deal with questions that the “heart” poses and so Benjulia resorts to a convenient evasion: “I’m not a lawyer” (188). He is no more successful in resolving the ethical issues surrounding vivisection than were the Commissioners and politicians who framed the Cruelty to Animals Act. He falls into the trap of his own logic to become merely a trader in knowledge, preoccupied with his flawed system of investigation.

As the novel advances Collins shows that vivisection progressively hardens its exponents and blunts their sensitivities until their pleasure derives from their cruelty. Early signs of Benjulia’s anti-social behaviour emerge at the zoo when he prefers to see the sick monkey rather than to be introduced to Ovid’s companions (104) and where perceptive Miss Minerva understands, “ ‘Doctor Benjulia wouldn’t be interested in the monkey unless it had a disease of the brain’ ” (99). Even while he attends Ovid (who has fainted), Benjulia’s mind is on the monkey, his next victim, in a state of stupor now, drugged not to relieve the animal’s trauma but for the convenience of the physiologist.¹⁵ As Ovid slowly revives, Carmina attempts to thank Benjulia for his attention but he brushes aside her hand--not angrily but “just as he might have brushed away the ash of his cigar or a speck of mud in the street” for he has been impatient to retrieve the sedated monkey that he tucks under one arm “as if it had been a bundle” (110). In these comparisons Collins makes clear Benjulia’s indifference to both human and beast. And Zoe’s happiness, in the false expectation that the big doctor is taking the monkey home as a pet, is an irony that invites chilling reflection.

¹⁵ The German physiologist, Klein, had argued that a vivisector was no more concerned with the pain of his victim than a cook or a sportsman. He openly stated that he used anaesthetics on animals to avoid being bitten or scratched, not to alleviate their pain (Lansbury 130).

Primates are known to take pleasure in each others' company and to perform services for each other. In Collins' representation Benjulia's social instincts and sympathies are so underdeveloped as to suggest he is a throwback to an earlier form preceding that of the primate he has sedated. Even Benjulia's family relations are represented as "indifferent." They had "matured into downright enmity" (183) since Lemuel had discovered the secret of his brother's "Medical Research." Such is the state of their relationship that Benjulia's interest in his brother resides in the state of his brain (187).

At home Benjulia's cruelty is directed against his cook's romantic dreams as she indulges her fantasies (chapter 37) and he abuses his position of power over his servant to taunt her aspiration. He finds sadistic amusement in disappointing her hopes. Her distress is, for Benjulia, a joke sufficiently diverting to put him in a good mood to greet Mool when he arrives; his only disappointment has been that the cook's rage has been alleviated:

Always a physiologist, even in those rare moments when he was amusing himself, it had just struck Benjulia that the cook -- after her outbreak of fury -- might be a case worth studying. But she had got relief in crying; her brain was safe; she had ceased to be of interest to him. (217)

Benjulia is, as Collins tells us, ever the physiologist and probes his cook's susceptibility to further his own medical knowledge, regardless of her feelings, just as he will do with Carmina. However, in the instance with the cook, Collins is also ridiculing popular misconceptions about fiction, especially that reading novels involves psychological risk.¹⁶ The argument associated women with nerves, nerves with hysteria, hysteria with imagination and imagination with fiction. In the mid-eighteenth century Whytt, a pioneering physiologist of the nervous system, had reasoned that:

¹⁶ Collins makes a joke of this fallacy: Mrs Gallilee, who scorns fiction, goes mad.

doleful or moving stories, horrible or unexpected sights, great grief, anger, terror and other passions frequently occasion the most sudden and violent nervous symptoms. The strong impressions made in such cases on the brain and nerves often throw the person into hysteric fits. (quoted Veith 162-63)

Raulin had noted that "disordered imagination" could be contagious (Veith 169) and noted that dwelling on fear, sadness or surprise was likely to produce nervous symptoms in women of passion (Veith 169-70). Dega argued that girls should study mathematics and stop reading novels (Showalter 53). Sensation fiction was held by some to be doubly dangerous because it upset class barriers and introduced lower-class scandals to contaminate middle-class readers, amongst whom women, because "nervous" were especially susceptible. Margaret Oliphant, discussing "Sensation Novels," expressed her concern over standards set in *East Lynne*:

It is evident that nohow, except by her wickedness and sufferings could she have gained so strong a hold upon our sympathies. This is dangerous and foolish work, as well as false, both to Art and Nature. (567)

Collins has worked the sequence with the cook as a parody of *Pamela* in which he satirises sentimental fiction that satisfies expectations of happy outcomes regardless of probabilities determined by character and circumstances -- a clever irony since *Pamela* is, like much sensation fiction, the story of a lower-class heroine and a rake. And, like sensation fiction, the "classic" is also a mixture of romance and realism. But the distinguishing feature of Collins' method is that the horror of the scene rests less in the threat of the knife and the overthrow of master-servant relationship and more in the mental confrontation that is sketched in sufficiently to stimulate readers to imagine the missing details of motivation and hurt. That is, readers participate in the process of characterisation. The amazing thing about Collins' scene is that he mixes cruel abuse of power and humour--without the cruelty contaminating the

fun or the comedy cloaking the sadism.

Again when Le Frank suspects Teresa of poisoning, Collins jokes at the expense of stereotypical plots involving foreign villains.¹⁷ He distances his own work from such Gothic unrealities by showing Teresa taking pains to prevent an accidental poisoning occurring and then by using a commonplace accident to foil the spy. These instances of teasing jokes against literary conventions have none of the malicious pleasure that amuses Benjulia when he goads his cook to the point of violence. But they do show how committed the artist of realist fiction is to representing credible possibilities, not exaggerated horrors.

Collins uses his first hand knowledge of art to show where science and art meet, and to pit old methods against new and artificial ones. Robert Graywell, in the tradition of the "old Masters" is shown to have used his own colours and Teresa's husband had been engaged to mix them. As a competent and professional artist Graywell would have known the composition of pigments and the chemical processes necessary to produce uniformly stable and beautiful tints. This is a point Collins attests when he gives to Graywell's daughter the name "Carmina." Traditionally in Europe, a tin salt was added to the solutions of cochineal and alum (free from iron) to produce carmine. The tin was said to improve the colour. In England, however, manufacturers rarely used tin. Instead they used extra cochineal that produced a fugitive carmine, which, though its colour was rich and beautiful, was subject to fading (Barff 254). So Collins has characterised Carmina: beautiful but fading in extreme conditions. Her very name becomes symbolic and a reminder of a traditional connection between art and science.¹⁸

¹⁷ A villain and a foreigner who drugs his victims but is still cultured and charming, Fosco is no stereotype.

¹⁸ Notice that Miss Minerva insists that the name is given an English pronunciation with the accent falling on the first syllable (62) thus emphasising the likeness .

Much humour is generated at Mrs Gallilee's expense when Collins contrasts her reading preferences with Carmina's aesthetic sensitivity for poetry. The ridiculousness of Mrs Gallilee's display of learnedness is set against Carmina's willingness to learn, showing the ascendancy of the artistic and open mind over stuffy narrowness. Pompously dismissive of Carmina's interest (112), the aunt seeks to impress her young niece with her own reading on "coprolites," from what she describes as "a charming book"(111). But Collins identifies Mrs Gallilee's "taste" as a sham, revealing that the book is valued more for external trappings than for its content. It is a "presentation copy from the author," made to seem attractive by its beautiful binding (111). Furthermore, the language of the science "friponne"¹⁹ is made pretentious and prudish: "coprolites" are "the fossilised indigestions of extinct reptiles" (111). Repeatedly Collins' novels invite readers to assess characters' worth in terms of their commitment to the Arts: Carmina, Blyth and Lucilla rank highly while, in *The Woman in White*, dabbling in art is expressed as a Fair-lie. Mrs Gallilee, both a fake and unartistic, ranks at the lowest end of the value scale. While Collins has been ready to dissociate physical health with moral worth, he readily connects artistic taste with moral health.

Lest the case against Benjulia seem overstated, Collins transfers some of his arguments against positivism in science to Mrs Gallilee and her coterie. Her actions are made to seem petty and cruel simultaneously so that she emerges as a bully, "successful" only in dissecting vulnerable subjects. For instance, inconvenient pets are to be poisoned when their

¹⁹ "Friponne" was Huxley's term to describe women with scientific ambitions (Beer 205). While the term is appropriate for Mrs Gallilee, it is inappropriate for Miss Minerva so that it is clear that Collins' view of women in science is not anti-feminist -- as Huxley's apparently was.

Kingsley, too, expressed a bias when he argued that women were *part* of nature, not students of nature (Myers185) and, though he favoured educating girls, made a distinction between male and female knowledge.

presence irritates. She has no comprehension of the fragrance of the ferns she collects (76) or of the usefulness of the bees she dissects (71). Flowers are for cutting, the uniformity of the pansy inviting "murderous mutilation" (191). Once isolated, Carmina too is exploitable. Noticeably, Collins makes no distinction between them when he describes the "merciless" activities of Benjulia, and Mrs Gallilee's investigations. To her, instruments of dissection are "exquisite" (72) while flowers are "part of the furniture" (112). Even so, she features only as an amateur and a petty crook compared to Benjulia as arch villain.

Beset with anxieties over money and the ostentation that money supports, she uses others (husband, brother, son, niece, members of her household, tradespeople and professionals) as Benjulia uses animals--for personal gain. Like Benjulia, her deceits are described as devilish, part of her "inbred capacity for deceit" (76). Tried, she is shown as reflecting "the sinister fascination of the serpent" (180). She is without religion. She acts coldly, mechanically, without feeling so that her "laugh was not one of her foremost fascinations" (136). It is a mechanism contrived to operate selectively, about the mouth area, without affecting her whole person. "It was hard in tone, and limited in range--it opened her mouth, but it failed to kindle any light in her eyes" (136) for she has "starved her imagination, and emptied her heart of any tenderness of feeling that it might once have possessed" (67). She has not the imagination to look past her own ends to the consequences of her actions on others. She has concern only for the fact immediately before her so that Collins, emphasising the narrowness of the scientific viewpoint, adds, "her scientific education left her as completely in the dark, where questions of sentiment were concerned, as if her experience of humanity, in its relation to love, had been experience in the cannibal islands"(67). Neither she nor Benjulia understands that there

are cases where morality overrides self-absorption.

Her self-indulgence is just as dangerous as Benjulia's reclusive asceticism because it is equally extreme, but while the huge "living skeleton" (95) remains a gigantic figure to the end, Mrs Gallilee visibly disintegrates. Her early beauty, for a time artificially reconstituted (74) eventually is lost: "the paint and powder on her face had cracked, and revealed the furrows and wrinkles beneath" (248). Her deceit is revealed, her original source of pride extinguished. Like Benjulia, she is defeated by her own vanity and her exaggerated pursuit of power.

Comte, having dismissed religion and essences from his three stage positivist theory, still recognised a need to find a place for sentiment. But neither Mrs Gallilee nor Benjulia, in their bald and extreme form of positivism, acknowledge such a need. Yet, ironically, for all his boast of pursuing Knowledge (sic) for its own sake Benjulia's language, especially in his tirade to Lemuel, is strongly emotional and personal. His struggle seems to be to pursue his studies objectively, as a positivist, and to deny his own humanity of feeling. The struggle assumes manic proportions as he protests, "Knowledge sanctifies cruelty" (190).

Collins' case against the vivisector is developed by humanising the monkey, just as activists had already done causing Cyon to complain that their placard, "The mute appeal of the poor monkey," was a shameless fabrication:

It represents a monkey fastened upright on the vivisection table, his eyes raised to heaven, and his paws held out in a supplicating attitude. ...It is unnecessary to add that the only head in the picture with a human face is that of the monkey (Cyon 503).

Benjulia is shown to recognise the monkey's "cries of suffering, his gestures of entreaty" as human-like, so human in fact as to remind the physiologist of his young (and only) friend, Zoe. The similarity horrifies

him. The connection is an unfamiliar one that causes Benjulia momentarily to re-think his commitment. But his monomania resumes control. Benjulia continues, "But I went on. In the glorious cause I went on ... all for Knowledge!" (191) Throughout his outburst the capitalisation and ritualised repetitions suggest, ironically, that knowledge is being deified, and that, painfully, any tenderness is being drained from him in consequence. Readers are led to see Benjulia, less as the mad doctor of Gothic horror stories, and more realistically as a sick and misguided victim of a scientific mania, whose madness is responsible for his sadism.

Collins makes the "religious" fervour with which Benjulia speaks seem an affront to Christian faith. In the 1850s Collins did not spare his criticism of religiosity, a point well demonstrated in his criticism of sabbatarianism in *Hide and Seek*. Then, the problem he addressed was the form Christianity should take. By the 1880s, he seems to be confirming a role for religion and linking heart, art and religion as each reliant on a common element of "faith." Ovid understands: "His mother's religious convictions began and ended with the inorganic matter of the earth" (81) and Benjulia falls silent when he is unable to comprehend "love," even with the help of the dictionary (246). Some matters defy definition and require trust, as Carmina knows. In this example the suggestion is that some knowledge is unprovable. Science, even passionately pursued, does not, and cannot, have answers to some types of questions. There is a space that metaphysics and religion must fill. Consistently Collins demonstrates that, in dealing with emotions or ethics, science asks the wrong questions. It is too prescriptive to deal with affective complications of the passions and mind.

The connection between love and religion is stressed chiefly through the introduction of Father Patrizio's letter through which Collins

expresses the view that "Love ... is Religion, in women"(164) and emphasises that that understanding has been developed from long observation and sharing secrets. Though the introduction of the priest's letter is an awkward tool to effect a change of heart in Miss Minerva, it is important for establishing the value of the intangible resources of the human spirit.

Mrs Gallilee's calculated attempt to bring Carmina and Benjulia together has nothing to do with her niece's health. It is part of a plan to prevent Carmina's marriage for her own monetary advantage. When her first attempt fails, remembering that Ovid has expressed his wish that Carmina and Benjulia not meet, she seizes her new opportunity to create discord between the engaged couple (178). Readers already know how resentful Ovid was of Benjulia's demeaning reference to Carmina as "misbegotten" (101-3). Mrs Gallilee does not have this information and so she recognises Ovid's dismissive words concerning Benjulia as an excuse. She considers possible reasons for his reservation and assumes that Ovid thinks that Benjulia is suspected of impropriety. But she dismisses that estimation of Benjulia:

Girls were objects of complete indifference to him--with the one exception of Zo. Never yet, after meeting him in society hundreds of times, had Mrs Gallilee seen him talk to young ladies or even notice young ladies (179).

Nevertheless, she will use Ovid's "clumsy excuse" (as she sees it) as "a means of action capable of being used against Carmina " (179). Indeed, like Benjulia, she will use any means to effect her greedy ends.

As it happens, Benjulia encounters Carmina almost by accident and during Mrs Gallilee's absence (241-42). Their meeting is awkward on both sides. Carmina remembers Benjulia's rudeness at the zoo and Ovid's apparent dislike of him (98, 107). For his part, Benjulia is uncertain whether Mrs Gallilee has repeated to Carmina his slander against her

mother (242). To complicate the situation Null is there, at first actively trying to impress a colleague and then retiring and becoming obsequious before the noted specialist. He withdraws when Benjulia "estimates his mental calibre at its exact value" (243). Collins already has given ample explanation for their mutual unease. Carmina's embarrassment is compounded by the sexual politics that regulate rules of conduct in relations between men and women in the Victoria period. Unchaperoned, both are attempting to act in accordance with conventional proprieties when Benjulia prepares to leave. He expresses the usual formalities: he doesn't wish to intrude (243). It is shown further that Benjulia doesn't intend, at that stage, to compromise his dignity before Carmina by playing with Zoe. For her part, Carmina, fearing to appear brash and bold, and confused that her manner may have been ungracious, is worried that she has been inhospitable and invites him to stay.

Whilever Benjulia thinks Carmina's embarrassment is merely the result of shyness, she is not "an object of even momentary interest" (243). Once he observes her agitation, that view changes. Like the cook, she has become "an object of medical enquiry" so that Benjulia's attention is distracted from the playful Zoe. He quickly notes in Carmina an uncontrollable nervous reaction, manifest in her pale, flushed face and the rapid movement of her eyelids and lips, and he reflects, "Under certain conditions of nervous excitement, Carmina might furnish an interesting case" (243). He is shown as an opportunist, prepared to cultivate such conditions. His calculation is a further instance of Benjulia's single-minded obsession with scientific experimentation and of the lengths to which he will go to satisfy it.

An awkward silence falls between them until Zoe causes further embarrassment for Carmina by inviting Benjulia to tickle her friend. For a

moment Carmina is poised between relief (from laughter) and hysterics. Has Benjulia remembered how laughter brought relief to his cook? He avoids that outcome on this occasion by halting Carmina's laughter with his intense scrutiny. He regains control and allows her nervous excitement to continue. Awareness of his notice further disturbs Carmina so that the excess of her reaction deepens his interest. With snowballing impetus, tension grows. She recoils when he takes her pulse and her behaviour becomes exaggerated, alternating between speech and silence, between being abusive and submissive. When he commands, she obeys but is still not yet composed and seems ready to collapse.

From the first Carmina has been embarrassed by Benjulia's "coldly enquiring eyes" (244) that seem to control her at critical moments. She protests, "'Don't look at me in that way! It's your fault if I'm excited. It's your dreadful eyes that do it'" (245).²⁰ Once Carmina is exhausted and falls silent, Collins comments,

Any other man, whether he really felt for her or not, would, as a mere matter of instinct, have said a kind word to her at that moment (245).

But the hardened vivisector, intent only on his object, persists (245). He even prepares to revive her should she faint under the pressure of his questioning (246). To him she is only an object with "an interesting temperament, whichever way it end[s]" (246)--another inferior and expendable item.

Zoe's familiar questioning of Benjulia leads Carmina into bold conversation she would not normally engage in with a new acquaintance, least of all a male, her senior, and in her aunt's home -- questions of life,

²⁰ These hints that Benjulia has hypnotic power may have been suggested by *The Professor's Wife*, Leonard Graham's novel of 1881, where a husband "entrusts the care of his wife to Professor Golbig, a sinister German physiologist based on Klein. Golbig keeps [her] drugged and hypnotised, and in that condition, she slowly dies "(Lansbury 132-33). Or, more directly, Collins' reference to Benjulia's controlling eyes may reflect the work of the neurologist Charcot who was using hypnosis in his study of hysteria (Veith 236). This would be consistent with Collins' long held interest in mesmerism.

death and love. And while Benjulia looks clinically at Carmina's emotional state which borders on hysteria, her sensitivity enables her to read him: lonely, rootless and loveless, " 'a hard man! a miserable man! a man that will end badly!' " (245). His cold, professional observation is matched by her intuitive understanding.²¹ Previously Miss Minerva had reported the occasion when Ovid had spoken on the subject of instinct and reason and found that sometimes, " 'people of feeble minds, who judged by instinct, arrive at sounder conclusions than their superiors in intelligence, who judged by reason' "(98). Also, Miss Minerva reported, Ovid had respected Mr Gallilee's instinctive hatred of Benjulia (99). Now again, a sensitive, instinctive judgment from Carmina will prove to be correct. Collins represents here the epistemological position he projects consistently across his career, that both intuition and reason are means to knowledge.

Collins' sequencing of details in the exchange between Carmina and Benjulia has been finely balanced. Tension mounts as Carmina's hysteria grows and Benjulia's threat intensifies. Then the tables are turned: in the struggle between insight and reason Carmina's intuition and compassion dominate and Benjulia, "in thrall" (247), falls silent. He who used his eyes, almost mesmerically, to control Carmina, is himself overtaken by the mystery of what might have been, an alternate direction for his own life with freedom to love his fellows and become fully human. Although the novel is structured as the love story of Ovid and Carmina, it is not a sexual love that is the context of Carmina's exchange with Benjulia. She is describing the love she shares with her old nurse and the affection she feels for her young cousin, a sentiment she openly expresses with a kiss.

²¹ Here Collins adopts a Victorian perception that differentiates male and female. This is not the case when he depicts Miss Minerva. She is a woman who observes *and* feels. The contrast between Carmina and Miss Minerva draws further attention to the discrepancy of sexual stereotyping in real life.

Such feeling, the “agape” of Scripture, she correctly senses is foreign to Benjulia.

The description of Carmina’s worsening mental state throughout this scene provides the medical basis for her collapse into partial catalepsy when Mrs Gallilee slanders her mother and denies Carmina’s legitimacy. Already Collins has shown Carmina’s susceptibility to intense feeling. Readers are told of her situation of recent grief and dislocation. Above all, she is shown now as a lonely figure without connection. Connection, Collins demonstrates again in this novel, is fundamental to the human condition. In this key scene between Carmina and Benjulia that fact is recognised even by ten year old Zoe who understands that expectation of Teresa’s imminent arrival is making her lonely friend pent and tense and unlike herself. At the opposite extreme, Benjulia, who has chosen to isolate himself and renounce even family ties, nevertheless, because of his human condition, is unwillingly being forced into a recognition that he too has need of connection. Zoe is the pivotal agent throughout this scene. It is she who brings laughter and (momentarily) prospect of relief for Carmina. It is she who turns Benjulia to the dictionary that, with a word, calms Carmina with the memory of Ovid and at the same time raises doubt in Benjulia’s mind about the choices in life that he has made. And Zoe is Benjulia’s one link with community.

Zoe’s name is a guide to her character and figures her love of life. Amusingly, Collins chooses the Zoetrope ²² as, literally, a “trope” for young Zoe. It was a popular child’s toy, the precursor of the Praxinoscope, both developed to capitalise on an optical illusion understood as the persistence of visual impressions on the retina. Of all the optical toys available, the zoetrope allowed more than one person to view

²² A description of the zoetrope is given by Cooke, C. (165-66).

simultaneously (Crary 113), giving it a social dimension--just as Zoe has and the very quality Benjulia lacks. And, of course, it mixed the science of optics with fun, the blend of learning that Collins' novel is recommending. Once her role in bringing Ovid home is known, Zoe's fond father seeks to reward her and, understanding her fun-loving character, chooses a zoetrope as "the most magnificent present that could be offered to a young person of ten years old" (302). Mrs Gallilee, however, overlooks the possibility that someone so slight and negligible as her younger, unruly daughter, can have been responsible for Ovid's return. In her eyes, her daughter is little more than the zoophyte she studies (71). Yet Collins preserves the Romantics' regard for the unspoilt potential of childhood, despite the influence of her mother, and represents Zoe as typical of children at play, full of spontaneity and exuberance, enjoying life and the simplest games and especially the game of imitating grown-ups.

Zoe, a bossy child (when she has opportunity) asserts herself playfully, exercising her authority by taking hold of Benjulia's cane, hiding it or running off with it. Tickling, Zoe regards as play, for herself and for Tinker. Collins describes the game:

[Benjulia] put two of his soft big finger-tips on her spine, just below the back of her neck, and pressed on the place. Zo started and wriggled under his touch. He observed her with as serious an interest as if he had been conducting a medical experiment. (96)

The distinction between reflex and sensory nerve action was already known from the 1830s. So tickling Zoe to produce a motor reflex action falls outside Benjulia's specialist area of interest which is brain disease.

Besides, the expression, "As if," tells readers that this is not intended as a medical experiment. Yet his attempt to satisfy Zoe's demands automatically becomes another reflection of his work. He does not seek

deliberately to mystify his friend but uses the language he knows:

“That’s how you make our dog kick with his leg,” said Zo, recalling her experience of the doctor in the society of the dog. “How do you do it?”

“I touch the Cervical Plexus,” Doctor Benjulia answered as gravely as ever (96).

Because she is on “holiday” at the zoo and playing with the big doctor, Zoe interprets his words as a trick to return her to lessons. She has already learned to be suspicious of adults’ wiles and so she’ll have none of it: “She declined to notice the Cervical Plexus.”(96) Generally though Zoe instigates their play which is so much a favourite that Benjulia sometimes anticipates her request. In this way Collins makes Zoe the one humanising influence in Benjulia’s world, though neither one understands that this is so. Carmina, distracted as she is, nevertheless recognises a fondness that is the bond between them (244).

Without the restraint of her governess, Zoe takes liberties with her big friend and plays the tyrant, making loud and insistent demands: “ ‘Come up!... Stop! ... Look sharp!’ ” Furthermore, “Zo possessed herself of the bamboo cane, and led the way in,” twice seized Benjulia’s coat-tails, hid the stick, demanded to be tickled and, “left unnoticed and not liking it,” took her chance when she “saw her way to getting noticed” (242-46). These descriptive details signal Zoe’s function as a touchstone for Benjulia’s hidden core of humanity even before Collins writes:

It was only the hand of a child--an idle, quaint, perverse child--but it touched, ignorantly touched, the one tender place in his nature, unprofaned by the infernal cruelties which made his life acceptable to him; the one tender place, hidden so deep from the man himself, that even his far-reaching intellect groped in vain to find it out. There, nevertheless, was the feeling which drew him to Zo, contending successfully with his medical interest in a case of nervous derangement. That unintelligible sympathy with a child looked dimly out of his eyes, spoke faintly in his voice... (246)

Poles apart, Benjulia and Zoe are mysteriously drawn together by their common experience of rejection. Benjulia is an outsider. Zoe is an

“unsuccessful product” (64), accustomed to be overlooked (93). Moreover, their personalities complement each other, Benjulia withdrawn and morose, Zoe outgoing and fun-loving. Readers are shown Zoe fearlessly questioning (244)--and disregarding when it suits her (96)--the famous specialist; and the terrible vivisector indulging the playfulness of a young child. Each offers--albeit in small measure--what the other lacks.

The point is made that Benjulia’s cruelty is not instinctive; it is purposive and developed by deliberate intent and practice with the aim of achieving personal superiority. Similarly, the formal politeness Benjulia regularly uses indicates that Collins intends the vivisector to be seen to be merely playing a social role (103) while actual indifference leaves Benjulia isolated, not only emotionally from community, but also unable to comprehend his own humanity that, by habitual hardness, now has become “hidden so deep from the man himself” (246). Zoe’s logical step-by-step questioning, while Benjulia waits for Mrs Gallilee’s return, follows the pattern of Carmina’s earlier enquiry to Ovid (98) and establishes the emptiness of Benjulia’s life so that readers conclude, with Zoe, “ ‘Well, you *are* a miserable chap!’ ” (244). It seems that every part of Benjulia’s life is barren. Work alone is not enough to equip him for a social environment that is more co-operative than competitive and he is drawn to Zoe in unconscious recognition of the love and friendship that his personality lacked. Here is the explanation for his panic when he sees a resemblance to Zoe in the laboratory monkey (191).

Zoe’s role in the plot is not only to bring Ovid home. It is specifically, by her contact with Benjulia, to reveal a vulnerability in the “devil” that makes him seem human after all and is testimony that Collins kept to his purpose, as declared in his letter to Frances Cobbe:

I shall be careful to present [Benjulia] to the reader as a man not infinitely wicked and cruel... If I can succeed in making him, in some degree, an object

of compassion as well as of horror, my experience of readers of fiction tells me that the right effect will be produced by the right means. (Cobbe, *Life* 184)

In aiming to support the anti-vivisectionist campaign (“the right effect”) Collins will not follow the vivisectionists in using any means to his end. He will not torture the emotions of his audience with sensationalised horrors. Nor will he leave readers “indifferent” to another human being, however base. Therefore, without compromising his stand against the “infernal cruelties” of vivisection, he gives to Benjulia, through his friendship with Zoe, a remnant of humanity.

The need to connect, to belong, is a theme running through Victorian fiction and Collins’ novel is no exception. It is not confined to the love story. Mr Gallilee and his children, Carmina and her nurse, Mool and Mr Gallilee provide further examples, and Miss Minerva is a changed woman after she accepts Carmina’s friendship. On the other hand as the plot proceeds, Mrs Gallilee becomes increasingly isolated until she retains only one “learned friend” (probably a nurse who privately manages her mania at Ovid’s expense). The theme of belonging is affirmed in the concluding pages where Collins contrasts the happy, celebratory little dinner party at Ovid’s home (326) with the costly display at Fairfield Gardens, designed for the society pages of the press. In her empty house, Mrs Gallilee doesn’t understand the meaning of “happiness” any more than Benjulia understands “love.” Collins reduces Mrs Gallilee’s vaunted gathering of international scientists to a farce as frogs scatter throughout the house. The frogs’ “intelligent curiosity” mocks the theoretical excesses of the Professors who are gathered there. The ludicrous situation, however, is more than farcical; it is not designed merely for amusement. Serious comment, heavy with sarcasm, is made in the concluding paragraph. The Professors whom Collins describes are represented as anything but

"civilised." The mix of social and academic terms suggests they are upstarts, like their hostess, *arrivistes*, aspiring to a new scientific aristocracy. The irony is reductive: "Science" is made synonymous with an "At Home"; Mrs Gallilee is reduced to a "fair friend" and hostess to confound her scientific aspirations; and "lectures and demonstrations" are drowned out by "sonorous poppings" of champagne bottles. This farrago she mistakes for happiness.

Throughout the novel Collins has linked vanity with wickedness (204) and faith with happiness (248). Benjulia knows neither faith (321) nor happiness (244). Only his "work" makes life acceptable to the vivisector who has "sacrificed his professional interests to his mania for experiments" (97).

An ill-starred devil is the man
 Who will not do the thing he can;
 And what he can't, with blind ambition
 Will do, and works his own perdition. ("Words of Wisdom " 788)

Indeed, Benjulia is a Faustian character shown to be at one with the rebellious Renaissance Doctor though Collins insists that *Heart and Science is A Story of the Present Time*.²³ A key account of the legend that Collins would know (given his love of theatre and Elizabethan drama in particular) is given in Marlowe's *The Tragical History of the Life and Death of Doctor Faustus*. I notice that Benjulia's end follows Marlowe's version of the legend, not Goethe's.

Like Marlowe's Faustus, Benjulia is shown to be discontented with his contemporaries: Ovid's treatment of a young patient has failed and

²³ Collins owned both Lewes' and Lovett's accounts of Goethe's life and Berlioz' memoirs (*Catalogue* 3, 13) and he would have had access to various versions of the legend because there was a widespread, cross-cultural interest in Goethe's work, reflected for instance in magazine articles, on the opera stage and in Mary Shelley's *Frankenstein*. Huxley had even joked about Tyndall and his scientific philosophy of ultimate discovery using the Faustian legend (Basalla et al. 19). We can expect Collins to have read Browning's "Paracelcus" (1833) where he scientist learns the danger of allowing intellectual ambition to replace human affection.

Benjulia avers he himself will never return to regular medical practice. He declares, “ ‘ignorance will become knowledge--if a man is in earnest’ ” (100). With singleness of purpose and determination he states, “ ‘I go on a way of my own’ ” (101). Nevertheless he is beset with anxiety to discover what Ovid, the man he sees as a rival, has discovered. His anxiety is an early sign that his crime is already bringing its own punishment and, although he brags, “ ‘I am working for my own satisfaction--for my own pride--for the fame that will keep my name living hundreds of years hence’ ” (190, 211), yet he has to admit, “ ‘I am not master of myself’ ” (190).

Having rebelled against the moral order of society through his cruelties, to conceal his crime Benjulia has been forced into a self-imposed isolation where he loses the power of relating to others and even the will to control his growing excesses. At each stage in his decline Benjulia brings punishment on himself. As his suicide at the scene of his crimes suggests, Knowledge, pursued for *itself*, is soul-destroying.

Besides the many strong links in character and event there are other likenesses between Marlowe's play and the novel: tiny details, like the rumour that Benjulia has been practising alchemy, tilts against the current craze for education (11. iii, 5-10), and Carmina's words of faith (245) that recall the warnings of the good angel. Graphic descriptions of hell in the play have their equivalence in the implied hellishness of Benjulia's laboratory. The morality of vivisection is debated (in chapter 32) in the tradition of a morality play. Polemic mixes with comedy. Most telling, though, is the similarity of ideas: ultimately there is nothing superhuman about Faustus or Benjulia; they are human and they can fail. No amount of work, dedication and industry can legitimise their immoral actions. And no cunning or expertise can achieve human happiness, for the false god of knowledge is shown to be inadequate to deal with human affairs.

Furthermore, both Faustus and Benjulia are shown to be short-sighted. They disregard the implications of their deeds and fail to heed the inevitability of the consequences, or -- as Marlowe put it -- to acknowledge hell's existence. Each protagonist must discover his life is not his own, that it is not possible to "go it alone," and that there is a larger call on the individual outside himself and demanding allegiance. For this barely-sensed reason Benjulia, faced with failure, seeks the companionship of his one friend, Zoe. In her absence he takes for solace the cover of her copy book and puts that memento near his heart (321) for she is the "only human creature who has ever stirred in him something like affection" ("An Anti-Vivisection Novel" 335). This knowledge of the heart is not learned by reasoning. In Collins' representation, Benjulia's story becomes a rebuttal of scientific materialism that claims matter as the only reality, and of Positivism that supposedly eliminates religion as a source of knowledge -- just as Benjulia attempts to do when he affirms the creed (ironically so, for he resorts to the language of religion) " 'Knowledge ... is the one god I worship' " (100).

European physiologist, Claude Bernard, preached a new faith of experimental science capable of "teaching nature a new lesson" and rivalling God's creation (quoted Lansbury 153-54) and John Tyndall announced that science held an impregnable position and intended to "wrest from theology, the entire domain of cosmological theory" ("Presidential Address" 474-75). Tyndall asserted that science represented the highest level of human knowledge and that religious feeling was merely the stuff of poetry and emotion (440). Collins' novel, read in the context of the furore that followed Tyndall's Belfast Address, reacts against such scientific presumption.

Collins does not effect an unrealistic, last minute reversal of character to

allow Benjulia to escape the consequences of his crimes or to reconstitute his reputation and relieve despair. When Benjulia values Zoe's copy book cover, tattered and dog-eared as it is, and questions the old servant about her faith, it seems he is at the point of recognising that there are boundaries to what may be discovered through scientific investigations. At this stage, as Collins regularly does, he separates the worth of individuals from the moral choices they make so that, even though they make bad choices, readers may still find sympathy for them. This was the case with Thorpe (in *Hide and Seek*), with Nugent (in *Poor Miss Finch*) and it is so with Benjulia.

Whether during the sixteenth, nineteenth, or twenty-first century, the Faustian legend has a relevant statement to make about the responsibilities that come with knowledge and the power that knowledge brings. This is a theme that Collins' novel takes up. His argument is not one-sided. Singly neither "heart" nor "science" is shown to be adequate. The value of each resides in their combination. In boldest outline: Ovid Vere, a man of sentiment and intellect, succeeds. Nathan Benjulia, focussed solely on knowledge, fails. It is not to be assumed that the vivisector's failure makes a case for exercising sentiment alone. Benjulia's servant, having just learned his master's secret and in pity for the wounded dog, reacts with "mere sentiment"(323). His response is vengeful, " 'I wish to God I could lame him, as he has lamed the dog!' " and that wish makes him as unbalanced as Benjulia so that Collins intrudes with a narrative comment, "Another fanatic! another fool!"(323). (Similarly, Teresa's blind devotion that results in criminal outburst, is unacceptable.)

By focussing on the topical controversy surrounding vivisection and simultaneously aligning his villain with a legendary figure, Collins is able

to comment on science in general as well as vivisection in particular. He considers the place of science in the contemporary scene and shows that he is alarmed by the insensitivity and indifference shown by those whose energy is directed wastefully to hypothetical extremes and away from the goal of bettering humankind. Chapter 63 of *Heart and Science* ends the fiction conventionally -- with a marriage and a birth. But this is not the end of Collins' observations about the state of science in nineteenth-century Britain. In a coda-like passage Collins deals with the spurious reputation that he sees science building for itself. The mix of nationalities gathered at Fairfield Gardens accounts for the confused babel of voices heard there. However a larger irony is implied. Collins invokes Biblical authority against "superhuman men" who claim knowledge of creation and the mystery of life. In the Biblical story of the tower of Babel (Genesis 11), an explosion of information is nipped in the bud because men with wrong motives have been misusing their knowledge. This is exactly the point Collins is making in his representation of the vivisectionist. Now he is widening the application to liken nineteenth-century scientists, holding unrealised theories, with those builders of Babylon who had thought to build a temple-tower that would reach to heaven to be a monument to themselves. As the ancient builders had come to think that nothing was unattainable for them, so Collins sees some contemporary scientists attempting to usurp God's role by claiming ultimate knowledge for themselves.

The tower that was built to weld the community in Babylon together had the opposite effect. The people were scattered and their linguistic and political unity brought into confusion, rather like the rioting mobs that protested against vivisection in the streets of London. Mrs Gallilee's gathering of professors becomes a talkfest where the jargon of science

becomes a babel of clashing noises and the *disunity* within the scientific fraternity is emphasised. Their jargon used to describe shaky theories of creation, of man and the universe, mixes unintelligibly with the discourse of physics. Specialist cliques are made commonplace, shown to come together only for food and drink.

As Benjulia's story is built on legend so Miss Minerva has her genesis in classical mythology. Readers would readily have recognised parallels with the Minerva legend: no mother bore the goddess and no motherliness nurtured the governess. Both seem fierce and ruthless. Of the three virgin goddesses Minerva is the one called the Maiden (Parthenos) and Miss Minerva suffers the indifference of the man she loves (91). Yet her story also makes a contemporary statement but outside the stereotype of submissive Victorian governess. Her background is a cameo piece consistent with Buckle's "science of society" where the powers and resources of nature control the fortunes of man. Buckle's resultant inference that "the offences of men are the result not so much of the vices of the individual offender as the state of the society into which that individual is thrown" (Buckle 16) is borne out as Miss Minerva explains to Carmina how hers was a loveless childhood (173):

"I was the last of a large family -- the ugly one; the ill-tempered one; the encumbrance that made it harder than ever to find money enough to pay the household expenses. My father swore at my mother for *being* my mother. She reviled him just as bitterly in return, and vented the rest of her ill-temper on my wretched little body, with no sparing hand. Bedtime was her time for beating me."(225)

Those early years, she explains, have fitted her for a loveless future (173-74). Collins makes it clear that those experiences have had a determining influence over her life, leaving her craving affection.

Like Benjulia, Miss Minerva is proud and jealous, even suicidal. She, too, has a cruel streak but her tormenting is mostly self-directed though

she struggles to control herself in the misery of her station. Her intelligence is mocked and readers are shown her troubled, lonely heart, torn between jealousy of her innocent rival and gratitude for the generous friendship and understanding sympathy Carmina extends to her. Encountering Miss Minerva's inner struggles helps readers to understand that the fundamental sources of her troubles lie in a combination of restricted economic circumstances and the gender discriminations that judge a woman by outward appearance and so restrict her role that there is no escape for her energies, especially her intellectual energy.

Mrs Gallilee's answer, when (Ovid) once asked why she kept such an irritable woman in the house, had been entirely satisfactory, so far as she herself was concerned: "Miss Minerva is remarkably well informed, and I get her cheap." ...But it left Miss Minerva's motives involved in utter obscurity. Why had this highly cultivated woman accepted an inadequate reward for her services, for years together? (91)

Compared to conventional standards of female beauty, Miss Minerva is found wanting. She analyses her appearance (117): weighed against the cultural "standard" that equated outward beauty with moral worth, she concludes "if there is anything good in me, it doesn't show itself on the surface" (116). Despite her intellect, she is influenced by the stereotype to doubt her own value. However, Collins' representation debunks the physiognomist's belief that moral character is imprinted in outward form. Though, at first, Collins' portrait of Miss Minerva might make her seem like the stereotypical violent, wayward woman, deceitful with her employer, cruel to children and hostile to her rival, this is to forget the myth. The goddess of wisdom was also "warlike" to protect the home and champion civilizing influences. This also is the role of Frances Minerva. Far from being submissive, cultivated Miss Minerva uses her wisdom to out-think the pseudo-scientist, Mrs Gallilee, whom she recognises as merely dabbling in science (117). Knowing her enemy, she has the power

to reason out Mrs Gallilee's motives (169). Anticipating and outmanoeuvring her employer with immeasurable self-control and dignity, fearlessly fending off hurtful barbs spitefully planted (150, 175), Miss Minerva's prudence overcomes Mrs Gallilee's malice and anger.

Through their clashes Collins represents two kinds of will power: Mrs Gallilee's power to dominate others and Miss Minerva's to maintain control over her own impulses (e.g.119). Relevant in establishing the psychological depth of her character is the war she contends within herself. Collins is especially concerned with the inner processes of her characterisation over her outward behaviour and represents the governess understanding the strain self-control imposes on her rebelling nature (114, 119, 178,208). Severely taxed, in practical terms by debt (155) and in emotional terms by jealousy and frustrated sexual fulfilment, her resolute nature becomes uncertain whether to battle for good or for ill (116-17, 155, 173, 209). Her active conscience complicates decision-making. Then she confronts herself in the glass (163) still full of questioning until, ennobled by love (explained in the priest's letter), she commits herself to Carmina's cause and goes on to confess her deceit and share her secret with Carmina. Their bond is beyond words and the silence implies the depth of the understanding they share. The victory does not come easily and for a long time Miss Minerva had remained unsure of herself, her self-doubt engendering self-suspicion so that she repeatedly warns Carmina not to trust her. Still she emerges as the protectress, sure in decision and practically competent to deal with Carmina's emergencies. Miss Minerva models a woman rising above detemining fate and circumstances to find personal release and freedom.

Miss Minerva is the representation of a strong, resolute woman, normally sure of her judgment but nevertheless suicidally disturbed by

sexual frustration, her misery daily compounded by the presence of her successful rival and by the indignity of her employment that barely notices the individual woman and sees only her working role as governess. Chance saves her from the consequences of what passes popularly but simplistically as the frenzy of jealous rage, and from the promptings of despair.

Standing at the window, she looked down at the pavement of the courtyard -- it was far enough below to kill her instantly if she fell on it. Through the heat of her anger there crept the chill and stealthy prompting of despair. She leaned over the window-sill--she was not afraid--she might have done it, but for a trifling interruption. Somebody spoke outside. (145)

It seems that Collins is throwing down the challenge to science to explain the inner nature of the complex woman when he intrudes:

If Inquisitive Science, vowed to medical research, could dissect firmness of will, working at its steadiest repressive action--then, the mystery of Miss Minerva's inner nature might possibly have been revealed. As it was, nothing more remarkable exposed itself to view than an irritable temper; serving perhaps as a safety-valve to an underlying explosive force, which (with strong enough temptation and sufficient opportunity) might yet break out. (61)

Motivations need to be understood and repressive forces taken into account, he points out. These causes are more important than any superficial examination of resultant behaviours and are the proper concern of medical science. Here Collins seems to be endorsing the practicality of psychological study. The depiction of Frances Minerva questions how many women, like her, had been dismissed as quick-tempered and ugly or overlooked--and died. Collins' question is unwritten but, given the earlier explanation of Sara Macallan's suicide (in *The Law and the Lady*), the question is implied for, similarly, in Miss Minerva's "case" identity and self-expression are linked to psycho-social factors and not to any simplistically gendered catch-all, labelled "hysteria."

Nevertheless, hysteria is acknowledged as mystifying the medical profession where Benjulia comments about a fatal case to Ovid, " 'We

called it hysteria, not knowing what else it was' "(100). Collins shows how loosely defined is the label that is used to describe, in turn, Ovid's exhaustion, the fantasies of Benjulia's cook, Frances Minerva's frustrations, Carmina's catalepsy, the criminal outburst of Teresa and Mrs Gallilee's obsessive monomania as well as Benjulia's suicide. In each case different causes are attributed to very different behaviours as life's possibilities have caused each character to respond to challenge individually. It is impossible from Collins' representations to reduce human behaviour to a single or common process.

As Veith's history of hysteria demonstrates, medical science was unable to determine whether the various forms of behaviour described as "hysteria" were internal disease or external affliction and whether the causes were in the mind or in the body. It was uncertain whether hysteria was an inherent abnormality or an occasional dysfunction. Collins demonstrates that it is impossible to define "hysteria." Carmina is passive; Mrs Gallilee is violent. Ovid applies self-help; Benjulia self-destructs. In Carmina and Ovid the condition seems to have biological effects and medical attention is required to cure the illness. But in Mrs Gallilee and Benjulia the problem appears to be mental and moral. Even after her violence subsides Mrs Gallilee remains unaware of her real condition and Benjulia's ignorance of his real problem has fatal consequences.²⁴ Furthermore, in the medical profession Collins shows Sir Richard and Ovid disagreeing with colleagues (48) about using the old treatment of

²⁴ Another example demonstrating the confusion between affliction and dysfunction between mind and body is represented in the characterisation of Oscar Nubourg in *Poor Miss Finch*. Oscar's epilepsy is clearly shown to result from a physical injury. It results not from mental weakness or aberration. Yet the stigma of the condition affects Oscar's nerves.

bleeding (Veith 145). Ovid would appear to follow Sydenham's²⁵ recommended treatment in his care of Carmina, relying on the powers of nature abetted by medication (Veith 137). Mrs Galilee might well represent Charcot's theory of the hysteric: "vain and preoccupied with [her] appearance, deceitful and self-dramatising" (quoted Showalter 34) while Carmina might represent the influence of engrossing passion which, according to Rush (Veith 173-74), may be either cause or cure of hysterical complaint. I argue not that Collins is confused but that he is demonstrating a medical confusion by representing such a catalogue of theories.

However, there are important consistencies to be found in Collins' representation of what was loosely known as "hysteria." First, he reflects the neurological emphasis that, by the 1880s, was dominant in professional circles, if not among the general public, by restricting his use of the term "hysteria" in favour of terms like "brain disease," "nervous excitement," "nervous exhaustion," "irritation of the nerves" and "excessive nervous sensibility" that indicate the origin of the problem in the nervous system. Second, his terminology distances him from the outdated and literal connection between hysteria and uterine disease such as "suffocation of the mother," the result, it had been thought, of a displacement of the womb²⁶--though Maudsley, a leading spokesperson on the subject of hysteria in Collins' day, still connected hysteria with the action of the female reproductive organs on a nervous personality

²⁵ Sydenham's work was done in the late seventeenth century but had been re-issued in an English translation in 1848. As Veith reports, his work gradually "became part of medical thinking and furnished the basis for clinical practice and further scientific experimentation" (156).

²⁶ This was the subject of Weisenthal's article. But Collins demonstrates that Carmina's illness is the result of emotional stress and grief, and not a disorder of the reproductive system. And when Taylor looks at the science behind Mrs Gallilee's breakdown, she finds the cause not in her sexuality but in a false set of social values that leave her without self-identity as her beauty fades (Taylor 34-35).

(Slavney 19). Interestingly, though, Maudsley also argued that the limited range of activities for women was such as to deny them healthy outlets for their feelings (Showalter 16). This latter view he shared with Feuchtersleben who blamed particularly female education which he called the shame of the times:

It combines everything that can heighten sensibility, weaken spontaneity, give preponderance to the sexual sphere, and sanction the feelings and impulse that relate to it. (quoted Veith 190)

(Collins' strong statement on the education of Maria and Zoe will be discussed later. I have already referred to the parody on *Pamela* in terms of the supposed impact of fiction on females.)

Miss Minerva's repressed sexual impulse is not vaguely dismissed as hysteria. Instead her character is analysed psychologically. In the first stage Frances is shown expressing her desire in efforts to make herself attractive. Then failure to make herself pretty leads to frustration, to which she gives voice when she protests to Carmina, " 'Don't call me Fanny!' " (118). She equates that form of her name with "plump," "fair," "playful," "flirting"-- everything that she is not. In consequence she affects to disdain the image of that "creature." But her frustration is nevertheless revealed: " 'Call me Frances -- a man's name, with only the difference between an i and an e. No sentiment in it; hard, like me.' " (118). Thirdly, recognising that her sexual desire cannot be gratified, she then deliberately hardens herself and displays bad temper to make herself *less* attractive. Thereby she hides her pain by apparently confirming the stereotype of the plain, bad-tempered woman who will never marry.

The novel ends with the sugary suggestion that Carmina and Ovid's first daughter be named "Frances." But perhaps Collins is suggesting, hopefully, that the next generation will have the freedom to develop the potential of great hearts (301) like Miss Minerva's. For the name means

“free.” Certainly his portrait of Frances Minerva demonstrates that women can be both tough and feminine so that the fiction supports the work of female activists and professionals²⁷ against the gender bias, expressed in views like those of Cyon who makes repeated outbursts against his opponents, “hysterical old maids”(500) whose “tenderness, despised by man, has flung itself in despair at the feet of dogs and parrots” (509). The link Cyon asserts between female beauty, marriage and satisfaction (506) explains the pressure women, like Miss Minerva, felt to doubt themselves. The irony, of course, is that it is the twice married woman, Mrs Gallilee, fanatically in pursuit of science, who becomes deranged.

The novel addresses also the gender bias associated with nervous disorders for Ovid’s stress is developed alongside the “hysteria” of women.²⁸ Mood swings and dreaming were considered characteristic of

²⁷ Collins may be paying a tribute to Frances Power Cobbe. More likely, however, he is paying tribute to Mrs Hoggan (wife of Dr George Hoggan from whose letter to the *Morning Post* I have quoted above). The Hoggans were founding members of the Victoria Street Society and the initial meetings of that antivivisection lobby were held in their home (in Portman Square W. near Collins’ own residence), before the move to Victoria Street gave the group its popular name. Mrs Hoggan was named Frances and, unusually in those times, she was a doctor (Cobbe, *Life* 106).

As an artist and tourist to Italy, Wilkie Collins would have been familiar with the statue of Minerva Medica in the Vatican. The statue and Collins’ respect for Mrs Hoggan are two factors likely to have influenced his choice of name in *Heart and Science*.

Frances Cobbe appreciated such a connection, later recording, “I brought home from Rome as a present for my much-valued friend and lady-Doctor, Mrs Hoggan, MD (widow of Dr George Hoggan), a large photograph of the statue of *Minerva Medica*. Under it I wrote these lines:

Minerva Medica ! Shocking profanity!
 How could these heathens their doctors vex,
 Putting the cure of the ills of humanity
 Into the hands of the ‘weaker sex’?
 O Pallas sublime! Would you come back revealing
 Your glory immortal, our doctors should see, --
 Instead of proclaiming you Goddess of Healing,
 They’d prohibit your practice, refuse your degree!” (Cobbe, *Life* 106)

²⁸ Ovid is not an isolated example. An earlier portrait of Mr Fairlie in *The Woman in White* is a representation of hypochondriasis, the supposed male equivalent of hysteria (Veith 190), and an exaggerated fear of physical disease. In *I Say No* James Brown, denied love, suicides and Mirabel, the man suspected of his murder, unlike himself because for once honestly in love, becomes nervously prostrated and collapses.

nervous disorder in men (Veith 190) and these are the features of Ovid's behaviour that Collins describes in his early chapters. In *both* Ovid and Carmina depression follows the sapping of their energies and leads to breakdown and, although Ovid's fainting is far short of Carmina's paralysis, the process of nervous collapse is given a common cause: exhaustion. Ovid's nerves are affected by overwork; Carmina's from over-sensitivity. Either cause of imbalance is shown to be debilitating and dangerous.

Veith describes the proliferation of literature concerning hysteria in the nineteenth century when women were expected to be delicate and vulnerable as reaching "epidemic proportions" (209-10). Moreover, experience of nervous disorders in his own family is likely to have added to Collins' interest in the puzzle of hysteria with its apparent contradictions defying comprehension.²⁹ But in *Heart and Science* forms of nervous disorder become also narrative tools to describe Mrs Gallilee's deviant femininity and to explain Benjulia's brutality while a medical curiosity, traced out in Carmina's condition and identified as partial catalepsy, is used to advance the plot.

It is through Zoe, the character who turns the story around, that Benjulia's philosophy is shown to break down. Yet, many critics past and present prefer to relegate her to a minor position at one of two extremes: either she is a funny delightful child ("An Anti-Vivisection Novel" 337) or "unscientific and illiterate" ("Unsigned Review, *Academy* 330). Sue Lonoff describes her role as "comic relief" (27); Lansbury sees her as the

²⁹ In some respects the condition resembled the sleep-wake states associated with mesmerism and somnambulism (Veith 221) that feature in other novels. For instance, in *Armada*, while Lydia assumes the popular dismissive attitude to mesmerism, *Midwinter* is affected by "the magnetic fascination of [Lydia's] touch (465)--just as in *Poor Miss Finch* Lucilla experiences a tingle at Oscar's touch. In *The Moonstone* Collins quotes John Elliotson as his authority for Blake's conduct (382). Elliotson followed Mesmer's attempt to use animal magnetism for medical purposes.

means to represent Benjulia's repressed sexual drive (135-37); while Catherine Peters labels her "dyslexic" (Peters, *King of Inventors* 399). Farmer refers to her as "the idiot-child" (intro. 10) and then, influenced perhaps by his comparison with Sissy Jupe (intro. 26 n) in Dickens' *Hard Times*, writes that Zoe "reinforces the notion that the simple love of a simple child is powerful enough to conquer the dark and cold world of modern science" (10). He sees Zoe as Collins' "agent" who "unwittingly" saves the day. All these statements underestimate the complexity of the character Collins draws.

Certainly Zoe's letter brings Ovid home to confront Benjulia and save Carmina. But there is nothing "unwitting" about Zoe's action (256). Zoe's *purposive* thinking is stressed. For the child, as for the scientist, the means to finding a solution to a problem is "minute observation."

Possessed of that wonderful capacity for minute observation of the elder persons about them, which is one among the many baffling mysteries presented by the minds of children, Zo had long since discovered that the member of the household, preferred to all others by Carmina, was the good brother who had gone away and left them. In his absence, she was always talking of him--and Zo had seen her kiss his photograph before she put it back in the case. (256)

And just as embryologists were puzzled by early development and psychologists by the working of the mind, so too Collins describes Zoe's childhood capacities as "baffling."

Dwelling on these recollections, the child's slowly-working mental process arrived more easily than usual at the right conclusion. The way to make Carmina well and happy again, was to bring Ovid back. (256)

Relying on memory and observation, the child's intelligent reasoning process makes the right connections without false starts and she determines her action: to write to Ovid at once (256). For her writing is a painful task but it is seriously undertaken. She has the foresight to keep her letter secret even from the father she trusts, lest he tell mama, and negotiates with Marceline, her mother's maid, secretly to post her

letter in return for information (266). Collins' characterisation does not underestimate the thinking powers of a child.

At one point Collins addresses the matter of blots. He, Ovid, and Zoe share the experience of "something easy to feel, and hard to express" (316). They know the difficulty of giving a form of objective expression to what is basically something subjective, intuitive and unproven. That statement places Collins in a tradition that values intuition and sees reality, not as an ordered system, but fluctuating. Reason alone is not capable of grasping something so elaborate as the dynamic processes of life. The "dozens of sheets of paper ... covered with writing, blotted and interlined" (315) that record a medical breakthrough are no different in appearance from Zoe's smudged copy-book, her letters to Ovid, or Collins' own manuscripts so that self-consciously Collins writes, "you will see that the most patient men on the face of the civilised earth are printers!" (316). Creativity is not necessarily orderly and perfect and neither art nor science proceeds in simply linear formation, lock step and mechanically determined.

Further, Zoe's characterisation is relevant to the nature/nurture debate. Her apparent "perversity" is being shaped by a sense of inferiority. She is being given a distorted view of her own abilities but deserves neither the label "incurably stupid" nor "incurably perverse" that "friends of the family" attempt to impose on her (64). She is shown as a strong character with a will of her own, a fact acknowledged by her uncle Northlake (313) and by her cousins who play at anything Zoe tells them (314). (I have already described Zoe's bossiness with Benjulia.) Regularly responsive to gentle affection and kindness, she is "brightened and developed by happy autumn days passed in Scotland" (312).

The conviction Collins brings to Zoe's characterisation is typical of contemporary views on education and the distinction between learning

and general intelligence. Spencer's work had been published in 1861. In 1865 Ruskin had promoted teaching science to girls and turned science into fictional form. He stressed learning by experience rather than from authorities (Myers 171, 181). In 1870 Huxley was urging that science be taught in every educational institution and insisting that learning be real and direct, not merely book-learning. He encouraged questioning and stressed that scientific training must encourage scepticism until children are "compelled by the absolute authority of nature to believe" ("New Books" July 610, 611). By 1880 education could lay claim to being a science (Heyck 121).

From her less-than-intelligent mother, Zoe's stubborn refusal of tedious tasks (like memorising the political consequences of the granting of Magna Carta) earned automatic punishment: " 'Bread and water for tea' " (113). Subject to such regulation, Zoe wishes for a dog's life (202); freed from restraint she proves intelligent and Collins reminds readers that "Zo's mind had its gleams of intelligence, in a state of liberty" (208). She has been sufficiently observant to read Miss Minerva's suppressed emotion (207) and, having observed the servants, to anticipate that Ovid will kiss Carmina (94). Her powers of observation--that skill so valuable to the scientist and the artist--are further demonstrated in her clever imitations of the hurdy-gurdy boy (207) and Donald (314). She is quick to learn what interests and amuses her--as Collins demonstrates by contrasting her reluctance to learn scientific terminology (96) with her delighted exposition of Scots (314). Her sense of numbers is practical: she has no difficulty in remembering her own weight compared to Donald's (313-14) though she is reluctant to remember tables from a schoolbook.

Years earlier Collins had characterised young Zack Thorpe stunted by his father's domination but maturing under the care of the unorthodox

Mat. Again, with Zoe, he suggests that over-discipline is dangerous to development. It seems that Collins values Zoe's observant intelligence above tutored indoctrination--just as he admired the independence of young Jinks in *Poor Miss Finch* and her desire for freedom to explore. Collins shows a preference for a "free" form of education, unstructured, and "led by old Dame Nature (first of governesses!)" (94) that is responsive to the curious questioning of the child and rich in experiences. In the old empirical tradition, he regards nature as the starting point for the acquisition of knowledge. Much of Collins' severest criticism is levelled against a system of education that encourages "unendurable humbug" (224), embodied in Maria, the twelve year old "always ready to distinguish herself" (63) and projected as "the conventionally-charming child" who called everybody "dear " and who, sadly, had no real experience of life: "poor wretch! -- she had never wetted her shoes or dirtied her face since the day she was born" (64). Collins exactly opposes the sisters' learning: Zoe appears stupid because she is being "over-crammed with useless knowledge" (64); Maria appears educated because she has absorbed useless information unquestioningly. Maria's pleasure comes from exhibiting her memorised cramming. Her arrogance is linked to Benjulia's and opposed to the wisdom of Faraday who advised, " 'The first and last step in the education of the judgment is--Humility' " (quoted 286).

While Maria affects virtue and parrots "knowledge" without understanding, Zoe's refrain is, " 'I don't know.' " She puzzles over people's motives and is surprised by changes in behaviour, especially in her governess and her father (230, 251). She is silent rather than pompously vocal (85-86) and honest, and humble enough to admit ignorance. Maria is satirised as a counterfeit construct (64) modelled on the sentimentalised picture in a Christmas story (317) and we are shown how

affected she is when Collins remarks that she is “strong in conscious virtue” (86). Her prim artificiality of speech mimics the language of the model children of dialogue books of science (Myers 179) while Zoe’s careless grammar and spontaneity match the speech of a real child.

Maria’s name suggests that she is the model of her mother whose story has its complications. Her father had been a loving husband but disregarded his children (73). Only the son, Robert, benefited from the estate and he did so only because he had been his mother’s favourite. Deprived of attention and a share in the inheritance, Maria sought to compensate for the perceived injury. At first she found compensation by concentrating on her beauty. Then possessions, money, and status became her objects in life until jealousy of her sister’s favourable marriage drove her to centre all her earthly interests in the cultivation of her intellect. She associated herself with the march of science (71). Her ambition had developed out of all proportion and had centred on unrealistic goals. Her search for notice became a quest for power in a male-dominated field. When, having noticed her portrait in a faded volume, Mrs Gallilee is shown to recall her past and the values she once held, Collins gives depth to her characterisation and points out ironically how misplaced her later ambition had become (287). The photograph serves as a mirror reflecting, in psychological configuration, her self-doubt.

It is doubtful that she ever connects her jealousy of her sister with her pursuit of science though Collins uses the family lawyer to narrate her history and make her motivation clear to readers. In her madness she continues to fail to make meaningful connections in her own behaviour and so she continues to tell a story of her family’s betrayal with herself as victim. But Collins explains:

The general opinion which ranks vanity among the lighter failings of humanity, commits a serious mistake. Vanity wants nothing but the motive

power to develop into absolute wickedness. Vanity can be savagely suspicious and diabolically cruel (204).

That reflection on vanity holds for Le Frank, Mrs Gallilee and Benjulia, and for the excesses of Mrs Gallilee's scientific friends, as Ovid sees them, pompous poseurs:

"When you meet in society with a particularly positive man, who looks as if he was sitting for his photograph, you may safely set that man down as a professor." (161)

An intruded comment from the author is even more scathing:

See the lively modern parasites that infest Science, eager to invite your attention to their little crawling selves. Follow scientific enquiry, rushing into print to proclaim its own importance, and to declare any human being, who ventures to doubt or differ, a fanatic or a fool. (286)

Ovid, unaffected by such pretension, is shown to be overworked and feeling "out of himself" when he re-discovers love. Doctors report that he is physically and nervously exhausted. Depressed, "without a wish or purpose" (51), he is wandering, his memory sadly occupied with thoughts of a lost love, his young cousin who had died. With his thoughts so engaged, Ovid sees Carmina who shares a similar build and delicate beauty with the lost cousin--a connection his mother recognises as the reason for his sudden attachment (88). While "chance" may explain the couples' convergence in place--Ovid had diverted from his course to deliver a prescription--besides the family likeness, there is given further plausible psychological explanation for Ovid's attraction to Carmina. A tree, "fluttering its bright leaves" (50) was associated in his memory with another tree where he had first made love. However, even the psychology of association behind Ovid's attraction to Carmina has its mystery. First, we are told, the tree exercised a "calming influence, breathed mysteriously from the fluttering leaves" (50) so that Ovid finds in Nature a haven for his sad and listless spirit. Then, once he has seen Carmina, Collins writes again of an "influence" (51) holding Ovid so that he is totally absorbed,

following her and seeing nothing else, unreasoning and “out of himself” (51). So simultaneously a male nervous disorder is described and the explanation for “love at first sight” (by chance or fate) is blurred as Collins follows his regular practice of offering both emotional and rational explanations of events.

Although, from long absence, Ovid may seem a poor lover, he is nevertheless the hero of the story. As Collins points out, “All things are possible to a large heart” (320). Ovid Vere has “heart” large enough to offer a hand to the defeated vivisector (320) and to contract, discreetly, to pay his mother’s extravagant expenses (326). Ovid’s kindness complements his professional expertise and the balanced combination gives him heroic status in a novel where the need for heart in science is emphasised. But Ovid is no super hero and unlike Benjulia, makes no claim to superior knowledge or specialist medical status. And Benjulia’s obsessive, secret and heartless experimentation bears no resemblance to Ovid’s efforts to verify and publish the lessons of experience (46) or to Ovid’s intelligent recognition of the potential of unorthodox treatments that bypass “the trammels of routine” (48).

“I followed the conventional rules, as to quantities and combinations, and made the necessary additions or changes from my own private stores when the medicine was sent home.” (310)

Ovid is prepared to take a chance and his modification of a prescription, given a projection of possible success, reflects his understanding of pharmacology and his competence as a modern doctor; Benjulia slavishly persists with Null’s imperfect copy of Ovid’s adaptation.³⁰

Collins is vague about the exact treatment Carmina receives except to point out that her medication is given in experimental doses. That detail does heighten the literary effect. But, since the medical professionals of his

³⁰ It is easy to infer a literary parallel that justifies Collins’ literary radicalism and determination to experiment.

day had no means of testing neurological sensory transmissions, and since the scientific study of drugs occurred only late in the century (Haley 15), it is understandable that, to resolve the plot, Collins resorts to an unspecified treatment. Besides, rest and medication was the remedy prescribed by Sydenham (mentioned above) that was receiving renewed attention. Ovid's Sydenham-like practice triumphs and he is enabled to save Carmina and advance medical knowledge. But associated with this contrived resolution is a troubling possibility, fundamental to post-Darwinian science, that the outcome may be merely accidental. For chance turned Mrs Gallilee to science, chance saved Miss Minerva from suicide, chance linked Benjulia to Carmina, and chance took Ovid to the one person with the knowledge he needed to treat Carmina. Is this to be interpreted as fate or accident? Collins merges the possibilities by making Ovid's chance discovery a consequence of his great heart.

The novel also demonstrates that no law of chances can outweigh human fears and sensitivities. In a traumatic situation people don't stop to calculate chances; they react--as Carmina does when she has been shocked after seeing a stray dog run down. Subsequently, and quite illogically, she refuses to take a cab: "We may run over some other poor creature... If it isn't a dog, it may be a child next time" (58). Although she can mentally accept the reassurances of Teresa and the music-seller, their words don't alter her behaviour because her head does not rule her heart. "Carmina showed a deplorable ignorance of the law of chances" (58). The tone of the passage is tolerant and mildly amused, not critical, to indicate that this is the way feeling people are, their reactions more emotional than analytical.

Chapter four opens by stressing the unlikeliness of co-incidences and how easily people fail to recognise them (58). Collins points out that people tend to look for explanations to impose a form of regularity on

events, consistent with “the law of chances” (87), instead of accepting that coincidences may occur. This is the case where Collins refers to “the inevitable inference” that Mrs Gallilee might be present at the recital and the “certain[ty]” of her arrival, given her “leading principle”(59) of getting her money’s worth. Then when Carmina faints, Collins suggests, “Perhaps it was the heat of the room.³¹ Perhaps she had not perfectly recovered the nervous shock of seeing the dog killed” (60). But all along there is the hint of a more mysterious and fateful influence at work: “Vacant seats invited” the “unknown” aunt to seat herself next to the “unknown” niece. At other times it is shown how people fail to recognise intent and assume a coincidence has occurred. This is the case, for instance, when Carmina thinks she has met Ovid by chance after he has deliberately followed her to the concert (108). Given the frequency of such contrary misinterpretations, Collins demonstrates the difficulty in recognising a *law* of chances, imposing order on apparently random events.

In small, initial events Collins establishes the framework in which we will read major events. Zoe’s hope of a holiday co-incides with her mother’s machinations:

The passing aspirations of idle minds, being subject to the law of chances, are sometimes fulfilled, and so exhibit poor human wishes in a consolatory light. Thanks to the conversation between Carmina and Ovid, Zo got her holiday after all (87).

and Mrs Gallilee’s

unimaginative nature began to tremble on the verge of superstition. Twice, had the subtle force of circumstances defeated her, in the attempt to meddle with the contemplated marriage of her son ... When some people talked of Fatality, were they quite such fools as she had hitherto supposed them to be? (178)

Benjulia is dogged by the suspicion that Ovid might make a discovery ahead of him. Ovid does, but not intentionally. Does the explanation lie

³¹ Collins’ essay “Air and the Audience” (1881), released later as “The Use of Gas in Theatres”, concerned poorly ventilated English theatres lit with gas. The subject occurs also in the fiction, e.g. in *The Haunted Hotel*.

perhaps in Ovid's pride that determined him to use Benjulia's sealed letter of introduction (134) or in his generous, serving character, on the coincidence of being in Canada at the right time (and not cruising with a friend, as planned), or perhaps in the circumstances of Morpew's busy medical practice--or any other of a host of chance circumstances? How far does a chain of causality extend? These sorts of uncertainties underpin Collins' literary method. He finds fantasy and romance in reality and yet understands that "not one man in ten thousand" has made this discovery (46). For instance,

The general folly which reads a prospectus and blindly speculates in shares, is matched by the equally diffused stupidity, which is incapable of discovering that there can be any possible relation between fiction and truth. (61-62)

And Miss Minerva, reporting the meeting of Carmina and her aunt at the music recital, admits, " 'It is too theatrical to be believed' " (62). Collins similarly challenges unbelieving readers when he mixes speculation, destiny and fact as the ingredients of fiction. Nevertheless, it is the *spirit* of revolutionary breakthroughs in medical research that the novel captures and the many chances in the fiction mirror the point made in the polemic that scientific advances may occur by chance discoveries:

in medical investigations, as in all other forms of human enquiry, the result in view is not infrequently obtained by indirect and unexpected means (308).

Nor can the application of scientific methods guarantee discovery.

From the start of his literary career Collins used the example of the coincidence of small circumstances found in life to justify his fictional mix of romance and reality. This is the point made in the exchange when Ovid encounters Sir Richard (46). And it would seem that the subject of chance, an idea that permeates *Heart and Science*, was in Collins' mind even before the novel was grafted to the antivivisection debate. "A Little Fable," a signed fragment, has been printed by the Wilkie Collins Society. It has a

marked likeness to chapter two of *Heart and Science*. In both, two friends happen to meet. In the fable, one is considering “the procession of small circumstances” that has led him to “this unexpected meeting in the street.” In the novel, one is considering the “series of trivial circumstances” when a man walks out and is “presented” with a friend’s carriage drawing up by his side (46-47). In the fable, the friends consider the chance of such a meeting occurring; in the novel, Sir Richard speaks of the luck of success (47). Then as Collins’ narrator in the novel does (46), the friends in the fable agree in the view “that a man in the midst of reality is also, in this strange life of ours, a man in the midst of romance.” Given their professions, as mathematician and lawyer, presumably rational and logical thinkers, it can be supposed that their work has exposed them to diverse experiences. Yet each man in his senior years discovers that his education is incomplete.

In the way of fables much is left unwritten. Readers learn simply that one turns back to the bookseller to purchase a novel. The second returns to his friend and asks to borrow the book later. The fable is telling the same story as the novel: that a form of romance is needed to balance the seriousness of a working life. In an age becoming fixated on the rational modes of science, Collins urges respect for the usefulness of the mysterious, non-rational side of life for which the Arts find expression.