

## Medicine: the science and the art

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### Abstract

*Medicine has been said to be both a science and an art. Many practitioners regard this statement as containing an element of “either/or”. A brief look at what scientists and artists have written about their work and their world views, however, suggests that the two fields of endeavour form a complementary part of our attempts to understand ourselves and the world about us. Moreover, on occasion, each can perform some of the other’s tasks. This paper quotes from the writings of physicians, scientists and people active in the humanities in order to demonstrate how frequently their thoughts converge. It also presents a case report from general practice illustrative of the idea that there is much common ground between the “hard” and the “soft” in medicine. Indeed, the profession’s art and science may really be one.*

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The strong similarities between scientific and artistic activity hardly need pointing out. When an artist makes a penetrating observation, it often foreshadows a more formal one by a scientist and when science completes a convincing demonstration it can have the same aesthetic appeal as a work of art. One common denominator between the two spheres is the attempt to gain a deeper understanding of humanity’s condition: “There is perhaps room . . . for speculation about the mysterious relationship of science and art, and how they both illuminate in different ways the nature of human life”.<sup>1</sup> Another significant area of contact is curiosity. Balzac, on being given news of a friend who was ill, is said to have exclaimed: “But let’s get back to reality. Who’s going to marry Eugenie Grandet?”<sup>2</sup> Similarly, Henry James remarked how characters floated into his mind “all in response to my primary question, ‘Well, what will she do?’”<sup>3</sup>

Problem solving is a further aspect of both science and art that brings them together. Benjamin Britten wrote: “I can say with honesty that in every piece I have written, in spite of hard work, there are still passages where I have not quite solved problems”.<sup>4</sup> Silas Weir Mitchell, one of the nineteenth century’s greatest medical scientists, published a paper in 1860 on the venom of the rattlesnake. Like Britten, he was aware that the real riddle of the venom’s nature was unsolved. “The answer came to him twenty years later when he noticed that a rope doormat, partly unravelled at the corner, slightly resembled a serpent. He

suddenly realized that snake venom might contain a double poison, an entirely new concept”.<sup>5</sup> Mitchell’s ability to make use of a chance association for solving a longstanding problem that kept forcing itself into his awareness, might be regarded as an example of a fourth point where art and science are linked. It should come as no surprise, then, that Mitchell was one of the outstanding American novelists of his time, as well as being a man of singular achievements in medicine, physiology and public life.

In what ensues, I shall quote scientists, artists, physicians and historians who express their belief that the great fields of endeavour just alluded to have much to offer each other and, in some measure, can even do one another’s work. I shall also present a case from my own practice which, I believe, illustrates and makes concrete some of the quotations provided here. All these quotations were encountered in the course of casual reading and written down in the service of the following hypothesis: that the close connections between scientific and artistic activity, if demonstrated with sufficient authority, might break down the supposed dichotomy between art and science in medicine. This dichotomy has been expressed as “the dissonance between ‘the science of objective measurement’ and the ‘art’ of clinical proficiency and judgment”.<sup>6</sup> The reductionists, as the proponents of biomedicine have been called, urge that physicians “concentrate on the ‘real’ diseases and not get lost in the psycho-sociological underbrush. The physician should not be saddled with problems that have arisen from the abdication of the theologian and the philosopher”.<sup>7</sup> Much more recently, in making it clear that the real venue of medical activity is molecular biology, an opinion leader of international standing put down hermeneutic exploration as “pastoral skills”.<sup>8</sup> Finally, it has been pointed out by proponents of a broadened context for medicine that:

“power to predict and control outcomes with mathematical precision is extremely attractive to a practical science . . . Thus the temptation arises to maintain that medical practice should strive for mathematical explanations of all of the conditions of health and illness so that these conditions can be effectively controlled. Biomedicine succumbs to this temptation . . . But because mathematization can occur only through an abstraction that sets aside manifold properties of things, those properties abstractly set aside would still resist mathematical explanation. And these non-mathematizable

factors may nevertheless contribute to health and illness.”<sup>9</sup>

By means of the illustrations I shall provide, I argue that the art and the science of medicine are really one so that the distinction made between them on the grounds that one is “soft” and one “hard”, one scientific and the other not, is meaningless.

### What art and science have in common

Michael Feigenbaum, a physicist who has done pioneering studies in the field of chaos theory, wrote:

“What artists have accomplished is realizing that there’s only a small amount of stuff that’s important, and then seeing what it was. So they can do some of my research for me . . . With Ruysdael and Turner, if you look at the way they construct complicated water, it is clearly done in an iterative way . . . Turbulent fluids for those painters is always something with a scale idea in it.”<sup>10</sup>

In a letter to a fellow writer, Anton Chekov said:

“I thought then that the sensitivity of the artist may equal the knowledge of the scientist. Both have the same object, nature, and perhaps in time it will be possible for them to link together in a great and marvellous force which is at present hard to imagine.”<sup>11</sup> Here, progress by means of cooperation is clearly envisioned.

Marcel Proust, the novelist, often wrote of artist and scientist in one and the same passage, regarding both as experimenters, with the former thinking creatively after the experiment and the latter beforehand. When Swann, a protagonist in *Remembrance of Things Past*, listens to the music of Vinteuil, an important composer who is also one of Proust’s creations, he exclaims as follows: “An audacity . . . as inspired perhaps, as that of a Lavoisier or an Ampere—the audacity of a Vinteuil experimenting, discovering the secret laws that govern an unknown force, driving across a region unexplored, towards the one possible goal . . .”<sup>11</sup>

George Sarton, the historian of science, once wrote of the importance of being selective while carrying out research: “Now this brings science and art very close together, for right selection is the essence of art as well as science.”<sup>12</sup> Elsewhere in the same essay (page 43) he says: “To understand fully the human side of science, we must think of scientific achievements as we do of artistic achievements. Indeed, they are, at best, of the same kind . . .”<sup>12</sup>

Kramer and Lane have discussed in detail what causality means in clinical practice and research. “The truth or falsity of a . . . (retrospective) . . . causal proposition depends on what would have happened in the alternative world, which is inherently unobservable . . . causation inevitably involves a subjective inference about what might have been in the absence of a putative cause.”<sup>13</sup> We make the statement: “Smoking caused John’s lung cancer” but it can never be proven because we cannot reconstruct the world in which John did not

smoke. Moreover, in John’s case, we are dealing with an individual rather than an exposed group.

More than half a century earlier, William Faulkner, in his novel *Absalom, Absalom!*, spoke of “. . . that true wisdom which can comprehend that there is a might-have-been which is more true than truth.”<sup>14</sup> Thus, a person’s alternative world, though not given to observation, may be where he lives most of his life.

A recent paper has proposed that the link between science and the humanities within medicine is provided by curiosity. “What is kindness as perceived by the patient? Perhaps it is curiosity: ‘How are you? Who are you? How can I help you? Tell me more. Isn’t that interesting?’ And patients say: ‘He asked me a lot of questions’; ‘She really seemed to care what was going on with me’. Is curiosity the same, in some cases, as caring?”<sup>15</sup>

George Engel, recognising the need to know and be known as basic to humanity, asks in the patient’s name:

“Do my doctors know who I am, who I have been, who I still want to be? Do they understand what I am going through, my suffering, my pain, my distress? Do they understand my hopes and aspirations, my fears and shames, my vulnerabilities and strengths, my needs and obligations and my values? Above all do they sense my personhood and my individuality? Do they acknowledge my humanity? Do they care?”<sup>16</sup>

It would seem from this that patients are actually looking for curiosity on the doctor’s part, the same quality that, as we have seen, distinguishes the great scientist and the great artist.

On occasion, novelists have actually presented descriptions of disease not yet delineated in the medical literature. Herman Melville gave a detailed picture of an instance of sleep paralysis in *Moby Dick*<sup>17</sup> twenty-five years before Mitchell’s scientific account, generally accorded priority, was written.<sup>18</sup> Similarly Constable is said to have had a formula for painting clouds strikingly concordant with today’s meteorological classification.<sup>19</sup>

We have seen that activity in the sphere of science has much in common with that characterising the work of the artist. In particular, selectivity, problem solving, curiosity, observation, the ability to turn a seemingly remote or irrelevant association into a discovery, and an attempt to come to grips with humanity’s state are hallmarks of both. The extensiveness of this mutual ground makes one suspect that the two, in so far as they are carried out within the framework of medicine (a practical science with the defined goals of promoting health and ameliorating illness) are really one. “If the twentieth century has learned anything about Science, it surely is that Science is not socially, politically, or morally neutral.”<sup>20</sup> Neither are our patients! Therefore, in dealing with their human propensities to turn problems into illness, the deployment of insights gained from the humanities should seem as natural as the ordering of an x-ray or a blood test. It has been suggested that such insights may promote

empathy<sup>21</sup> and they can certainly serve as instruments of hermeneutic exploration. The following case elucidates a few of the ideas brought forward thus far.

### **An illustrative example**

I was working in a small town, employed by Israel's largest health maintenance organisation as a general practitioner. The day on which I was due to retire was only a few months off and I found myself thinking of things I might be doing "for the last time". The clinic was usually not busy at one o'clock and the door to my room from the waiting area stood ajar. There was a knock and someone pushed the door a little farther open, asking: "Doctor, may I speak to you for a few minutes?" I indicated the chair opposite me and motioned for the man, who was large and stooped, to sit down. Not recognising him as one of my own patients, I waited for his opening.

His name, he said, was Avraham and his doctor was not on duty that afternoon. He had been told that he suffered from angina pectoris; lately, things had grown much worse: he had pressure in his chest most of the time, none of the many medications he was taking seemed to do any good. He had referred himself privately to a cardiologist in Jerusalem, who was weighing the possibility of performing an angiogram. In the meantime, he was to try a drug that had just become available to see if it would afford relief. Avraham produced a short letter from the cardiologist from which it was clear that he understood what he had been told. The problem would be to get the health maintenance organisation to finance the procedure, which would be performed in a private cardiology suite. He did not have the means to pay out of his own pocket.

I observed that Avraham wore a frayed, knitted skullcap and that he was shabbily dressed. He sighed frequently, often shifting his weight on the chair. His face was deeply seamed, appearing careworn. He said that he was a high-ranking clerk in the town's government, having come to Israel from Iraq in the 1950s. He was fairly well educated and amply compensated for his work, but the money didn't go very far because he had eight children, including a couple of girls eligible for marriage.

When Avraham lapsed into silence, I asked: "What do you think has caused your condition to worsen?" "I know exactly. It's the evil eye". Though not precisely what I had expected, the answer was given with as much certainty as any grounded in the cause-and-effect of physiology and biochemistry. "People envy me because I have just married off one of my daughters to a brilliant young student of Torah whom everybody wanted for a son-in-law." He paused and then went on: "But there is another problem. I have other eligible daughters and in our circle it is customary to inspect the bride's family closely, sometimes even a couple of generations back. One of my sons is an albino and I can't very well hide him in the attic when the prospective bridegroom's parents come around". He was now shaken by the deepest sigh of all and fell silent once more.

Avraham did not affect the black dress of the ultra-orthodox and even his skullcap was of the "wrong" kind, being knitted, which spoke of certain nationalistic inclinations as opposed to the midnight silk, which signifies that one must wait patiently for a sign from God before attempting to re-establish Jewish nationhood. He was dark-haired and dark-featured so that I could easily imagine the contrast with the tow-headed albino at home. It was not hard to empathise with Avraham's predicament, a veritable tangle of inconsistencies. I wondered out loud: "Does the cardiologist in Jerusalem know all the things you have told me?" Avraham shook his head, adding: "He didn't ask".

When referring to himself and his family, Avraham kept using the phrase "in our circle" as though he had not noticed that I, too, wore a skullcap. Could he mean "among us oriental Jews", assuming that my background was Western? Or did he have in mind the fact that, for reasons possibly unknown even to himself, he was trying to marry his offspring into the dominant ultra-orthodox community to which he did not really belong? I was not sure.

The interview concluded with my offer to speak to Avraham's regular physician about what had passed between us and his acquiescing. There was, of course, nothing to be done about the albino boy except, perhaps, to help the father see that he was a blessing in disguise. He would exert a kind of selection pressure on any parents considering a union between their son and one of Avraham's daughters. Only the more intelligent and open-hearted would recognise that the gene or two manifest in the prospective brother-in-law were matched by tens of thousands potentially leading to far worse characteristics than a mere lack of pigment, that could not be desecrated. As for the evil eye, a few words from the regular doctor to the patient's rabbi might help.

I wondered at the empathy I felt for Avraham. Human beings, I thought, are not usually drawn to those who are unhappy. Perhaps, for all the outward differences in our circumstances, the two of us had a good deal in common. I was ambivalent about retiring and, while happy to discard some of the responsibility I bore for other people's wellbeing, realised that that was the source of their needing me and I still had the need to be needed. While most people would probably say my career had been successful, I was no longer certain of the fact. There was a good deal of disorder in my own life and even if I felt more in control than Avraham did, we were still to a considerable extent, brothers in perplexity.

I don't know how Avraham's story ended or whether he ultimately required angioplasty or coronary bypass. I am concerned that, if he did, the decision was taken on the basis of incomplete information. Moreover, the evil eye should have figured in the picture as largely as a blocked coronary artery and, unrecognised, might have foiled whatever therapy was prescribed. The elements predisposing to the transfer of important information between Avraham and me were, for the most part, those that are common to art and

science: curiosity, selectivity, the need to come to grips with an aspect of the human predicament, observation and problem solving were all involved. It must be emphasised that the selection of the material for discussion was entirely his own. There is no way that a biomedical “review of systems” could have got me either to the evil eye or to the albino offspring. Finally, the factor that acted as the catalyst for the interview, perhaps more than anything else, was my having, purely by chance, the requisite leisure for conducting it.

It seems to me that my interaction with Avraham can be subsumed under the heading “connexion”,<sup>22</sup> which is to say we experienced a peculiar kind of closeness when, on the surface of things, our situations were very different. Matthews, Suchman and Branch have explored the term, derived from “co” (together) and “nexus” (a drawing in of parts to form a whole), and they conclude:

“We are fortunate to have the marvellous advances of our modern technology, but they cannot supplant the particularly human contact that physicians and patients share. Because our collective knowledge of technology is not currently coupled with an equally systematic knowledge of relationships, we clinicians have much to learn, individually and as a group. Exploring issues of connection and meaning in medical care, like venturing onto any other unfamiliar terrain, requires both curiosity and caution . . . . Through a scientific process of consensual validation . . . (of our experiences in the medical interview) . . . we can help each other learn to integrate the connexional dimension into modern medicine.”<sup>22</sup>

It would appear that the operative words here are “not yet coupled”, implying that the day is near when Chekhov’s prophecy of “a great and marvellous force”<sup>21</sup> emanating from close co-operation between art and science will be fulfilled.

### Envoi

Herman Weyl, who died in 1955, was one of last great universal mathematicians. Freeman Dyson, a colleague who worked with him at the Institute for Advanced Study, Princeton, wrote of him as follows:

“Characteristic of Weyl was an aesthetic sense which dominated his thinking on all subjects. He once said to me, half-joking: ‘My work always tried to unite the true with the beautiful; but when I had to choose one or the other, I usually chose the beautiful.’ His remark sums up his personality perfectly. It shows his profound faith in an ultimate harmony of nature, in which laws should inevitably express themselves in a mathematically beautiful form.”<sup>23</sup>

Would it be too much to suggest that Weyl perceived a certain sterility in truths that are not beautiful?

A striking example of how close together the ideas of artist and scientist can be is given by Herman Hesse and Niels Bohr, two of the greatest fig-

ures in the history of twentieth century thought, the former a writer and the latter a physicist. Hesse wrote:

“A good, a real truth, so it seems to me, must stand being inverted. When something is true, then it must be possible for the opposite to be true as well. For every truth is a brief formula for the appearance of the world seen from a certain pole, and there is no pole without its opposite.”<sup>24</sup> Bohr, for his part, was fond of saying that the opposite of a merely correct statement is a false statement; but the opposite of a truth can often be an equally profound truth.<sup>25</sup> The similarity of this concept, held by scientist and artist, to Karl Jaspers’s Fourth Law of Understanding should be noted. The law states: “Opposites are equally meaningful”.<sup>9</sup> In other words, opposing interpretations can be based on the same evidence. Both as physician and as philosopher, Jaspers is close to our subject.

The interesting relationship between truth and beauty suggested by Weyl received additional support from John Keats:

“When old age shall this generation waste,  
Thou shalt remain, in midst of other woe  
Than ours, a friend to man, to whom thou say’st,  
Beauty is truth, truth beauty—that is all  
Ye know on earth and all ye need to know.”<sup>26</sup>

This is not to say that, in medicine, beauty is entirely on the side of the “soft” and truth on that of the “hard”. Rather, both what is amenable to measurement and what is not contribute to the composite portrait of a person, which we must draw if we are to extend to him or her the right kind of medical care.

Biomedicine is often accused of hubris,<sup>20</sup> yet some of its greatest practitioners have been acutely aware of its limitations. Sir George Pickering, an outstanding medical scientist and clinician, who wrote the chapter on hypertension for the earliest editions of Harrison’s *Principles of Internal Medicine*, said that: “Each advance in knowledge represents to some extent a simplification. Nevertheless most advances are an over-simplification, and new data require modification, if not total repeal, of ideas that seemed an advance before”.<sup>27</sup> This is powerfully reminiscent of the great painter working and reworking his canvas or, for that matter, of the physician pursuing hermeneutic exploration with patience and with humility, much as Edwin Muir wrote of Penelope at her loom: “Endless undoing of endless doing”.<sup>28</sup>

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