BOOK REVIEWS

Wilson, E.O. (1998). *Consilience: The unity of knowledge.* Toronto, ON: Random House of Canada, 367 pp.

This is an important book not only for educators, but for all who recognize the imperative to begin to consider our problems and concerns in interdisciplinary terms. In fact, I think that it may someday be judged as one of the most significant publications of the late 20th century. Wilson is expressing what is obviously an integration of ideas from his own life's work in biology, along with conclusions derived from a broad background of reading in the history and philosophy of science. The book is about consilience: "literally a 'jumping together' of knowledge by the linking of facts and fact-based theory across disciplines to create a common ground of explanation." Wilson's argument that the search for unifying rules and concepts is the wave of the future is shown throughout the book to be well-warranted both in terms of past and present successes in the physical sciences (which have tended to focus on problem areas that cross academic disciplines), and the corresponding *failure* of the social sciences and humanities (which have been handicapped by mutually incompatible models tied to traditional disciplinary boundaries).

Clearly Wilson did not intend this book merely for interdisciplinary theorists who are already convinced of the need to accept the scientific endeavour in all scholarly pursuits: those whom he terms the modern empiricists. Rather, he follows Einstein in attempting to reach the more unsatisfied and questioning of the scholars still trapped in the older, anti-science transcendental mythologies which would appear to demand a rigid separation of humanity from the rest of nature. He does this by expanding the concept of "being religious" to include the sense of wonder and awe involved in empirical inquiry into the workings of the natural universe. In Wilson's terms, the religious quest is thus broadened to cover the general human desire for meaning and understanding; and for control of one's surroundings – what many people call natural human spiritual yearnings. As he puts it, "preferring a search for objective reality over

revelation is another way of satisfying religious hunger ... a stoic's creed .... It aims to salve the spirit, not by surrender but by liberation of the human mind." And the greatest enterprise of that mind in every age, he tells us, has always been the attempted linkage of the sciences and humanities in a world view that makes sense of both as creative human enterprises. According to Wilson, we don't have to live with fractured bits of unintegrated findings. "The ongoing fragmentation of knowledge and resulting chaos in philosophy are not reflections of the real world, but artifacts of scholarship." Elsewhere he notes that much of the current mess in philosophy may be due to the fact that the Enlightenment was actually dead for that enterprise by the early 19th century, with its ideal of open inquiry into the order of the universe continuing to live on solely as a spur to the *physical* sciences. (Education, unfortunately, has been a major victim of the resulting isolation of the two cultures of the humanities and physical sciences.)

I especially appreciated Wilson's reference to Francis Bacon's "idols of the mind," as this concept has always rung a bell for me. These are:

1) *the idols of the tribe* (a false myth-based order imposed upon their experience by humans – which they then use to imprison themselves within a cave of their own creation);
2) *the idols of the marketplace* ("reification" or belief in the reality of an abstraction merely because someone has devised a word to symbolize it); and
3) *the idols of the theatre* (the tendency to accept without question the pronouncements of artfully articulate, influential authority figures).

He offers, as examples, various cultural currents which have threatened scientific progress since the Enlightenment, from the various waves of Romanticism to the present dominance of the postmodernists. He describes the latter as "a rebel crew milling beneath the black flag of anarchy;" but argues that they, like their similarly reactionary predecessors, may serve indirectly to strengthen science. He suggests that the external enemy creates pressures for us

to sharpen our arguments, better explain our theories, and more definitively to corroborate our findings – all of which might contribute to general scientific progress in the long run.

Wilson claims that the greatest schism in the world today is the divide between prescientific and scientific cultures, for the former must inevitably remain without the means of adapting to changing circumstance, and are thus necessarily regressive. He reminds us that no method of inquiring into the nature of reality – other than the empirical one – has ever worked, "no exercise from myth, revelation, art, trance or any other conceivable means; and *notwithstanding the emotional satisfaction it brings, mysticism*, the strongest prescientific probe into the unknown, has yielded zero."

Wilson goes on to suggest that the greatest challenge facing science today is "the accurate and complete description of complex systems." He explains that the much-misunderstood chaos theory simply states that "extremely complicated, outwardly indecipherable patterns can be determined by small, measurable changes within the system." This has the economy and simplicity of all potentially powerful theories, but Wilson emphasizes that the pressing need is for supporting empirical data. A related challenge is to understand more thoroughly the operation and products of the human brain, and how this relates to culture and its evolution. As one would expect, Wilson thinks that a combination of complexity theory and the evolutionary approach is the way to go in neuroscience. "Brain scientists have vindicated the evolutionary view of mind ... [by establishing] that passion is inseverably linked to reason. Emotion is not a perturbation of reason but a vital part of it."

Wilson's elaborations of "gene-culture coevolution" are particularly interesting. His thesis is that "the human being has evolved genetically by *natural selection in behaviour*, just as it has in the anatomy and physiology of the brain." He explains that, to genetic evolution, "natural selection has added the parallel track of cultural evolution, and the two forms of evolution are somehow linked." Wilson believes that, although many animal species manifest complex social behaviours and routines, *culture* is unique to humans. This is because of the language instinct which our species happened to evolve. It consists of:

> Precise mimicry, compulsive loquacity, near automatic mastery of syntax, and the swift acquisition of a large

> vocabulary [none of which is present in even the closest and most communicative of our chimpanzee cousins]. The language instinct is a diagnostic and uniquely human trait, based upon a mental power beyond the reach of any [other] animal species, and it is the precondition of true culture.

He explains that what is genetically inherited is not the "memes" (those basic ideas or symbolic units comprising any culture) "but the underlying *propensity* to invent and transmit certain kinds of these elements of memory in preference to others." In other words, we inherit a bias to learn in certain directions. The two processes (genetic and cultural evolution) are interrelated and interactive, and Wilson suggests that one cannot be effectively studied in isolation from the other.

Educators should take note of the fact that, in the above task, Wilson is not counting on much help from the traditional social sciences – other than in the provision of examples of what *not* to do. However, he thinks that hope for the future lies in the fact that four bridges across the gaping divide between the two fields of study are now in place. These are:

1) cognitive neuroscience;
2) human behavioural genetics;
3) evolutionary biology – including his own sociobiology; and
4) environmental science.

Here I would have added that *education* – if it could become more scientifically based – has the potential to be a bridge as well. Wilson suggests a different candidate. He notes that there is one enterprise within the social sciences which most resembles the physical sciences in style, and is accordingly best posed to bridge the gap between the two. It is economics. However, that study is limited by the same problems shared by population genetics and environmental science.

> It is battered by 'exogenous shocks,' all the unaccountable events of history and environmental change that push the parameter values up and down .... Except in the most general and statistical terms, economic models cannot forecast the onset of bull and bear markets, or the decades-long cycles triggered by war and technological innovation. They cannot

> tell us whether tax cuts or deficit reduction is the more effective in raising per capita income, or how economic growth will affect income distribution.

A second fundamental difficulty with economics, Wilson maintains, is that it lacks a solid foundation of knowledge in the area of neuropsychology. (I would add that a general ignorance on the part of economists of the importance of culture and of the key role of socialization in transmitting it is also a problem.) Wilson notes that the seldom-acknowledged premises of most of the modelers in economics are based on nothing more reliable than "folk psychology." Consequently, the enterprise is badly crippled by a lack of understanding of the function of incentives as they actually operate in determining individual behaviours in real-life settings. He points to the dominant "rational choice" model in economics as a good example of this weakness.

Educators will be particularly interested in Wilson's chapter on ethics and religion. Here he presents the intriguing thesis that "the choice between transcendentalism and empiricism will be the coming century's version of the struggle for men's souls. Moral reasoning will either remain centered in idioms of theology and philosophy ... or it will shift toward science-based material analysis." Here Wilson admits to a private yen for deism – but much doubt as to the possibility of ever discovering the means either to support or refute such a hypothesis – coupled with a bias toward the idea of a material source of ethics. He presents a fascinating debate between a transcendentalist and empiricist, showing himself to be firmly in the empirical camp. He concludes that the eventual result of the struggle between the two world views will be "the secularization of the human epic and of religion itself."

Following this introduction he discusses the fairly obvious fact that, in the future, "hereditary change will soon depend less on natural selection than on social choice." This is where education comes in. Understandably, Wilson becomes something of a prophet in this concluding section, pointing out the horrendous environmental consequences of our continued refusal to attack the problems we have created by our failure to build the reliable unifying systems of knowledge required for a sound interdisciplinary approach to education. He sums up the coming catastrophe as follows:

1) Homo sapiens are approaching the limits of food and water supplies;
2) Most of the stress on the environment originates with a handful of industrialized countries; and
3) Even if the industrialization of the developing countries were only partially successful, the resulting population explosion and environmental aftershock would dwarf anything we can possibly imagine – and it may well be irreversible. He adds that it would be a mathematical impossibility for the living standards of inhabitants of the third world even to begin to approach those of the industrialized countries.

We simply cannot extend to all the world's peoples our unwarranted and dangerous privilege to pollute with ever more people and their products; we must, instead, remove that privilege here at home, and lower expectations everywhere. Otherwise, he says, Rwanda is the microcosm of the world of the future.

The final chapters presented some surprises for me, as well as some unexpected confusions in Wilson's world view. He tells us that:

> The central idea of ... consilience ... is that all tangible phenomena, from the birth of the stars to the workings of social institutions, are based on material processes that are ultimately reducible, however long and tortuous the sequences, to the laws of physics.

I think that this requires more elaboration than is offered. It smacks too much of the old deistic "machine analogy" for me. He would be better to have inserted here a discussion on the concepts of emergence and transition thresholds from complexity theory, so that it would be clear that he did not mean simply that all human behaviour can be *explained* in terms of physics, without reference to social and cultural and psychological factors. Surely he intended to say that no explanations at any level can *contradict* the laws of physics. A second problem for me is his labelling the search for such fundamental, material laws as "holism" – a word generally appropriated by mystics – rather than as the disciplined application of systems theory. I think the term of holism badly confuses the issue, because it denotes a mysterious, impenetrable unity defying analysis – something quite different from the synthesis which Wilson is

obviously intending. A third omission is his neglect of the key role of socialization in all this – and thus the need for a disciplined, knowledge-based educational process. These points aside, however, I can agree with Wilson's major conclusions, especially his focus on the overriding urgency of solving the problem of population expansion, and the importance of the search for principles of consilience in knowledge.

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Vogt, W. P. (1997). *Tolerance and education: Learning to live with diversity and difference.* Thousand Oaks, CA: Sage Publications Inc., 289 pp., (Softcover).

This detailed scholarly investigation of current and past research clearly delineates a pedagogically viable correlation between education and tolerance levels. According to the author cultivating and nurturing tolerant attitudes and beliefs is a necessary precondition for sustaining a pluralist and egalitarian society. This well-written text systematically explores and critically evaluates current and past research and provides statistics that together serve to redirect academic interest about the practical implications for developing the skills and understanding required to promote tolerance within educational contexts. The book therefore seeks to develop the skills and understanding required to guard against discrimination and injustice. In addition, it raises important issues about future lines of inquiry and methods of assessment to determine the environmental and personal factors that can ensure growth in