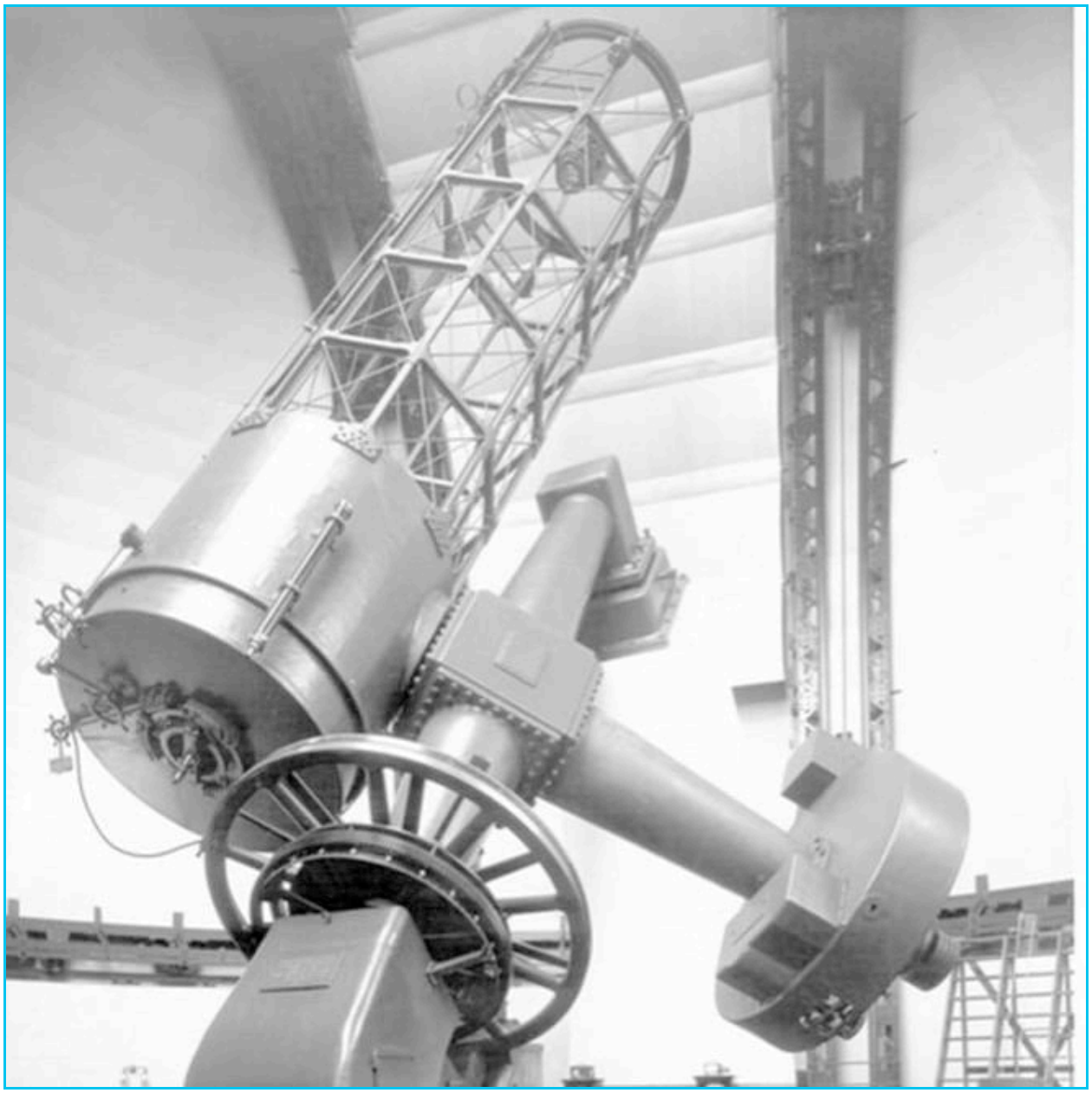

Being an Earwig in Astronomy

Proposing introspection to engineers.

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"Each of us has to do his little bit toward transforming this spirit of the times."
— Albert Einstein, 1954

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Telescopes

I have a fondness for astronomy since my brother introduced me to it when I was five. My important mentor and my first scientific publication were in the field of planetary astronomy.

Astronomy has a unique relationship among the hard sciences in that it depends entirely on remote sensing. Where other observers can retire to their own solitary observations, astronomers rely on each other.

On a prominent hilltop ten miles north of me a white dome marks the 100-year old Plaskett telescope. A telescope is nothing but a few lenses and lenses don't go out of date. This antiquated 1.8-meter instrument is kept up-to-date by attaching ever more sophisticated instruments to its receiving end.

I found my way up there on one autumn afternoon, discovered they offered school tours, and then chaperoned my son's third-grade class for a telescope field trip. Slightly below the summit a large, modern building wrapped around the hillside indicating this facility was more than just a museum. It was the Herzberg Centre for Astronomy and Astrophysics and the visibly dominant observatory was its mascot.

Psychology

People think psychology is a heady field, but I'm not impressed by its insights. Modern psychology consists of warmed-over insights from antiquity. What interests me is how different minds work, and that's not a field of its own as thinkers in every field have always wondered how their minds work. As you go back in time to earlier thinkers, whoever they were and whatever they thought about, it always included astronomy.

Astronomy is the oldest science, older than chemistry or physics, older than the scientific method, even older than math. Still, people somehow built temples based on the ecliptic and even dung beetles navigate by the stars.

So I thought, "I know astronomy, the scientific method, and I'm a therapist. I bet there's something I can offer to those folks at the Herzberg Centre!" In fact, my combination of being an astronomer and a therapist makes me unique. What insights I might have to offer?

Thinking

In the realm of cognitive development, the psychologist Piaget admonished, "To know an object is to act on it," but in astronomy that is only dimly possible. Unlike the toaster, which we can demolish, knowing the sky

requires that we have some understanding of what we're looking at. This reflects the difference between the child who goes out and plays and the child who must sit at his or her window and watch others play. This breeds a kind of introspection. The astronomer has a unique mindset.

The self-taught founder of modern hypnotherapy, Milton H. Erickson, MD, credits his skill to the long amounts of time he spent in an iron lung, almost completely paralyzed with polio, watching those around him. His experience was parallel to the astronomer's role in observation.

I recall an exchange between the astronomer Chandra Chandrasekar and physicist Ed Witten in the 1980s. Both men were known for their public reserve and private enthusiasm. Witten, who was little more than half Chandrasekar's age, commented that string theory was the most important idea in science. Chandrasekar responded that he had been around long enough to recognize the foolishness of that statement. The exchange reflects both the differences between the old and the young, and also between old questions and new answers.

People outside of science don't appreciate the prejudice that can permeate technical fields. In the 1970s work in the theory of gravity was practically as forbidden as irrelevant. Yet since the 1980s, with the advent of string theory, gravitational theory has come to pervade all of particle physics.

But there had been a change: what was previously rooted in observation turned theoretical. What had relied on instrumentation now relies on mathematics. The exchange between Chandrasekar and Witten occurred as a field that was previously nature-based was being remade by an exclusive group to become a glass bead game.

This difference between engineering and mathematics reflects the difference between empiricists and rationalists. In a larger sense, this reflects the divergence between pragmatic and idealistic thinking evident in areas such areas as economic policy, government funding, ecology, and education, to name a few.

Research

These questions have a place in the study of the history of science, but I've never heard them considered by researchers active in the field. These questions of understanding have been increasingly ignored by researchers in the hard sciences since a kind of philosophical sterility began to predominate more mathematical thinking that took hold in physics in the 1940s.

This is the same divergence that fueled the differences between Albert Einstein and Neils Bohr, and that have since established Bohr's epistemological indifference as the status quo. As a result, today's pop-science embraces naive, simple-minded concepts like the multi-verse and nonlocal interconnection. Without these ideas ever being fully integrated, they have invaded the popular imagination like a fungus.

Intelligence

IQ was once considered a singular measure. In 1983 Howard Gardener expanded the notion of intelligence to include eight separate measures: musical, visual, verbal, logical, kinesthetic, interpersonal, intrapersonal, and naturalistic. These have been expanded further to include pre-operational, concrete operational, formal operational, natural memory, factual memory, mediated memory, and constructed memory, and I can think of many more.

Shifts in our recognition of intelligence reflect our shifts from pragmatic to idealistic, from industrial to computational, and from ecological to exploitative and back again. These shifts have had huge effects on culture, politics, and ecology but they are hardly recognized as being rooted in our approach to knowledge.

There is a place in research for a discussion of different kinds of intelligence. At the same time, there is a tradition of denial that those doing research should be involved with such lofty thoughts as the purpose of knowledge or the meaning of intelligence. There is a certain conspiracy to keep people in the dark, much as most people are encouraged not to think too hard, and certainly not independently.

Outreach

This is material worth talking about, and it is pertinent to research trends and the personal psychology of researchers. With this thought in mind, I ventured back to the Herzberg research center, walked through its unattended doors, found a couple of people on the third floor, and through them was introduced to the manager of communications.

This research facility, which manages the data for Canada's astronomy community, rarely sees guests. I explained my interest in giving a presentation that combined astronomy and psychology while this administrator looked at me like an earwig that had fallen out of his shoe. I extracted his email address, a tepid handshake, and left with an unjustified feeling of victory.

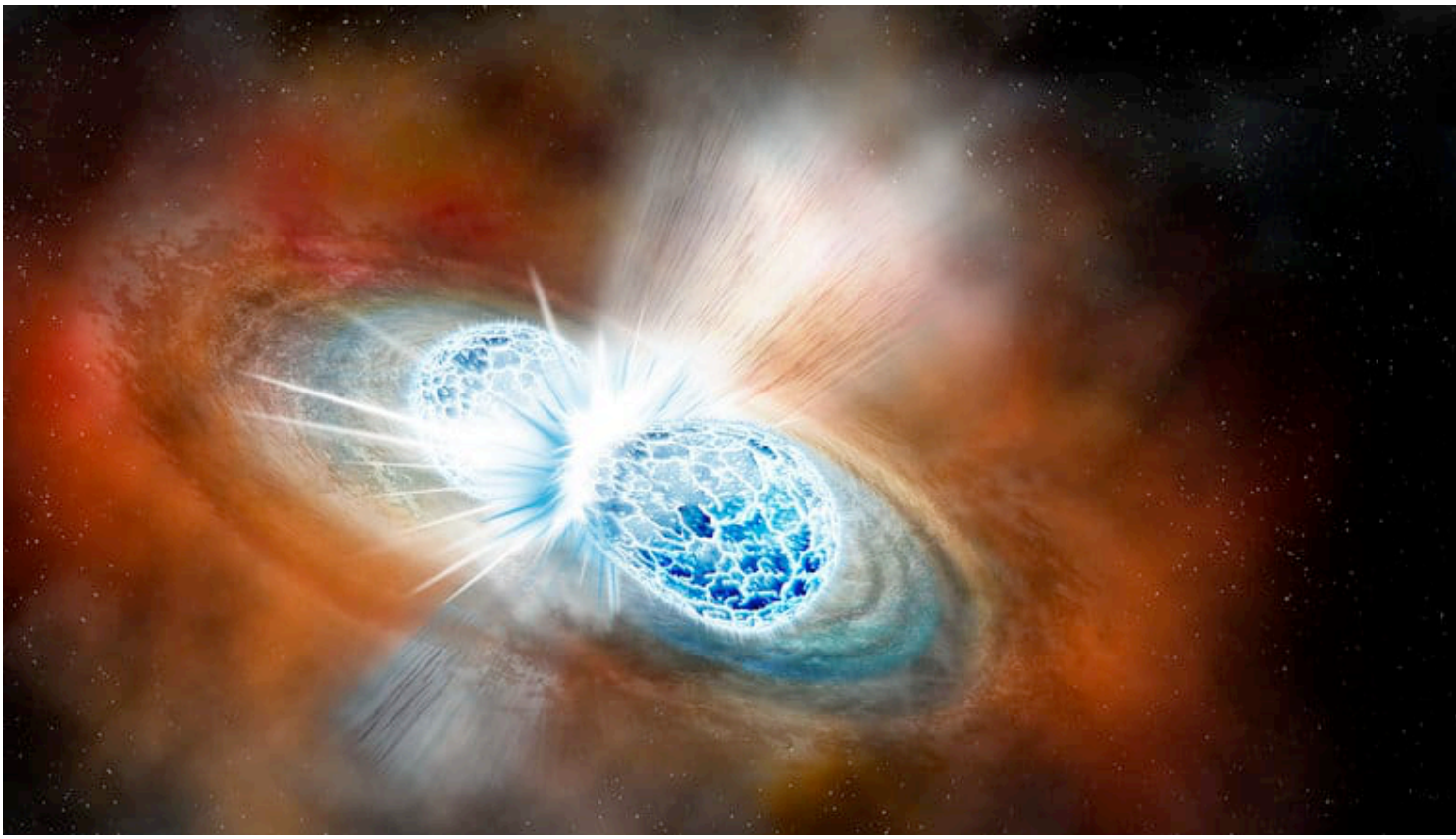
Change

As Gandi said, "First they ignore you, then they laugh at you, then they fight you, then you win." In the space of 15 short minutes, I had already moved through the first half of Gandi's progression. My next step will be to propose giving a talk at their research facility which, I fully expect, will elicit a combination of derision

and denial. This is, unfortunately, to be expected but, if I keep at it, some interesting conversations should come of it.

My goal is not to make a difference in institutional thinking. I don't even care to try. I was a physicist in the 1980s and I knew Ed Witten and many of his colleagues. I felt as unwelcome then as this administrator made me feel now.

What I might find, however, is a few people who, like the early mammals, are hiding under rocks waiting for an opportunity for the next stage of evolution. That's what it's always like on the cutting edge of anything: you are not welcome and you are not recognized. If one does get recognition, it's long after the battle has been fought and, usually, at a time where the respect that you're accorded can do no further damage to the status quo.



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