

From war to law via science

A Nobel laureate's optimistic view of our progression toward a civilized, peaceful world

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SPECIAL TO THE STAR

In mythical times a minor god by the name of Prometheus is supposed to have stolen fire from his boss Zeus, giving it as a gift to man. Zeus, not to be outdone, sent another disruptive gift to Earth: a gorgeous woman named Pandora. She brought her famous box, from which emerged a welter of human creativity that we term science and the arts.

The Greeks of 3,000 years ago who told this tale saw the peril that would come from such gifts. They also saw mankind's chief hope of survival: Then, as now, it lay in imagination.

Not too long ago — in terms of millennia — in 1945, the god Prometheus returned to Earth, bearing a new gift of fire. This time it didn't merely illuminate the dark of our caves. Through the instrument of atomic fission, and the still greater one of atomic fusion, it liberated the ultimate energy: the energy that binds together matter. The caves themselves became combustible.

With the caves gone, there was nowhere left to hide. That is the central truth about our world. We have no place that is not visible to our enemies so, rather than hide from them, we had better engage with them — talk to them and listen to them.

Our hope lies in Pandora's box. Through science and the arts, humankind can learn.

In the very same year of 1945, in the aftermath of their agony, the nations of the world joined in signing the Charter of the United Nations, one of history's greatest acts of imagination.

Today that Charter, in principle and ultimately in practice, is law for all 192 nations. At its core lies the provision that "all states refrain from the threat or use of force" against others. A state can only use force for self-defence, under circumstances defined and authorized by the UN.

Iraq, let me say, did not meet those conditions. But even if the world does not change overnight, the right to use force has devolved, under the agreed terms of the UN Charter, from individual nations to the collectivity that now speaks, however imperfectly, for mankind: the United Nations. For the first time in human history, war had been made subject to law.

This epoch-making change has taken place only in principle. The great ship that is history changes course slowly. But it cannot fail to respond to its rudder, the freely expressed will of humankind. The reason is that the principle underlying the UN Charter is clear and correct. It is based on respect for the most fundamental of human rights, the freedom to live without fear.

Physics is not such a vastly different system of thought from that which informs the UN Charter. It too blends logic with aesthetics — what is sensible with what is thought to be right. When the greats of physics meet to sign a new declaration, in favour, for example, of relativity or quantum mechanics, that too is only a change in principle. Decades of debate and insistent pressure from the new generation are needed before practice catches up with theory. But none among scientists discounts the importance of new principles. The same applies to the world leaders contemplating a transformed world. Principles matter, since ultimately those who govern need the consent of the governed, who care deeply about principles.

Declarations of principle, when they resonate in many minds, shape history. King John of England did not realize when he signed the Magna Carta in 1215 that he was doing anything different from earlier kings —

Henry I, Stephen and Henry II — who also signed charters that made promises. But the Magna Carta's time had come. Its promise of the fundamental right to freedom from arbitrary arrest has been the battle cry of citizens ever since.

But why are you hearing this from a scientist? Because science embodies the values that we seek in order to build a world governed by law. I don't mean to claim that scientists are paragons of virtue. I am only saying that science is a civilized pursuit.

And what is that pursuit? What is science? Not the collection of facts but the establishment, through open debate, of new principles that command wide acceptance.

This may seem to be a peculiar description of science. After all, you might say, scientists don't have to formulate the laws of nature, they merely discover them. But that is a superficial view.

Force equals mass times acceleration was a proposition made by Isaac Newton, not by God. The proof that the Creator did not use that equation is that, on close examination, it is wrong. It only applies to objects of large mass. It is altogether misleading when applied to subatomic particles.

Why is it so useful then? Because most of us can go through an entire day without consciously encountering a subatomic particle. Newton's equation works superbly for everyday things, like apples and planets.

How, then, did Newton's equation gain acceptance? New ideas have a hard time being accepted. Conservatism — fear of the new — applies in science as it does in politics. The science establishment, abetted in the 17th century by the Church, had a vested interest in pre-Newtonian mechanics.

It is here that science has something to teach us. The beauty of the new insight, explaining so much so concisely, captured scientists' imagination. Speaking figuratively, an international jury of scientists voted overwhelmingly in favour of the new view, overruling the powers that be. The great ship of science altered course.

I revert to this earlier image intentionally, to stress that scientists, in common with the rest of society, adopt new views through a gradual process of consensus. There is no magical moment of "proof" when all embrace a new orthodoxy. There is always room for dissent. Where science is exemplary is in its handling of dissent. Since every accepted view in science was at one time a minority view, scientists feel obliged to treat minorities with respect. Dissent, they know, is vital to the development of thought, so they go so far as to encourage it.

That, to put it simply, is why we have scientific conferences. At our meetings we judge the worth of dissenting arguments, not on the basis of the rank or race, colour or creed of the dissenter, but on universal principles of good sense and beauty.

Argument in science is passionate — a lifetime's effort may be at stake — but civility prevails. Though feelings run high, the resort to force is unthinkable, since the battle is for people's minds. So it is, if we would but recognize it, in the world at large.

This profound re-consideration of the role of force in human affairs should not lead us to reject the use of force under all circumstances. Nor does the Charter of the United Nations outlaw force. It insists, however, that the use of force be sanctioned by the world community, and it requires that force be used demonstrably as a last resort and to the minimum possible extent. What, then, should we be asking a future regime of international law to do?

Before addressing that question, we should be aware how much we are already asking international law to do, through such instruments as the United Nations, the International Monetary Fund, the World Trade Organization, the International Atomic Energy Agency, the Atmospheric Test-Ban Treaty, the Nuclear Non-Proliferation Treaty, the Convention on the Prevention and Punishment of Genocide, the Convention Against Torture, the International Tribunals on Yugoslavia and Rwanda, the International Criminal Court, the Kyoto Protocol on Climate Change, and so on.

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This is a formidable list. You'd think the world was a highly civilized place if you did not know that not all of these agreements are accepted by all countries, nor are all honoured by those nominally accepting them. But it remains true that a body of international law is emerging; that none of it existed before 1945; and that a huge amount remains to be done, inescapably and inspiringly, to build upon this basis. For it is the only direction that offers hope.

There is no limit to how far we can go in building international law; it is within human capability to go as far as needed.

This takes me back to where I began: ancient Greece.

The Greeks were well acquainted with killing and revenge. In their plays they symbolized the recourse to force as arbiter of disagreement. It ran through play after play — the Greek tragedies — as it has run through human history. But there came a pivotal moment in a particular Greek play, *The Oresteia* by Aeschylus, in which the cycle was definitively broken.

The stage was awash with blood (think of the year 1945) and on it stood Orestes, who had in the name of justice killed his mother, since she in turn had killed his father. Next in line to be killed was Orestes himself, now a murderer. Force served unendingly as an invitation to further force.

At this point the goddess of wisdom, Athena, intervened. She did something without precedent: She appointed a court of citizens to make a decision that all would abide by. In the play, that court was the audience. At this point the responsibility for what took place on the stage shifted dramatically to the audience; the collectivity in place of the individual.

Athena speaks (as translated by Ted Hughes, the late British poet laureate):

*Citizens of Athens!
This is the first case of homicide
To be tried in the court I have established.
This court is yours,
From today every homicide
Shall be tried before this jury
Of twelve Athenians.
Here my laws shall stand
Unchanged through the hours of the days.
And awe, that humbles the heart
Shall keep the pride of Athenians in check.
Protect this court
Which will protect you all
From the headstrong licence of any man's will.
In this court you have a fortress
Over the peace of men and their families.*

With that, the audience ceased to be witnesses to a play, becoming instead players. That is the most hopeful thing that we can do. It is this collectivity that gives force to law. It is this collectivity alone that can break the endless cycle of grievance and revenge. Individual will becomes subject to collective will; war becomes subject to law.

Nobel laureate John Polanyi is a professor at the University of Toronto. These remarks were adapted from an address last week to the World Affairs Conference, "Blueprint for a New World," organized jointly by students at Upper Canada College and Branksome Hall.