What's to do?

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“A community is like a ship; everyone ought to be prepared to take the helm”.

— (Act I, *An Enemy of the People*, by Henrik Ibsen, 1882).

This pronouncement of an idealistic newspaper writer in the nameless Norwegian town of Ibsen's 19th century tragicomedy sets the stage for complex conflicts involving science, health, vested interests, misinformation, political ambitions, altruism, and greed. Spoiler alert: It doesn't end well. The play's protagonist, Dr. Thomas Stockmann, is confronted with a dilemma when his medical research shows that the source of the spa bathing waters serving as the town's economic lifeblood is polluted. He concludes, evidence in hand, that the town's "healing" waters are putting the health of residents and tourists at serious risk. As a well-respected physician, Dr. Stockmann goes public and advocates closing the spa until the demonstrated threat to public safety is mitigated.

Stockmann is, at first, praised. However, internal and interpersonal tensions, economic conflicts of interest, and political pressures ensue. It turns out that Stockmann's father-in-law's tannery is the pollution source. His brother, Peter Stockmann, is the town mayor, constable, and chair of the spa's bath committee. Brother Peter's motives for suppressing the

doctor's findings are clearly self-serving. Even the newspaper's progressive editor, at first eager to use Dr. Stockmann's findings to unseat corrupt town officials, eventually succumbs to financial and political pressures and abandons his idealism. Public perception of the issue is manipulated by special interests, turning the town's merchants, trade workers, and the overwhelming majority of its citizens against the good doctor.

In naïve desperation, Dr. Stockmann calls a public meeting to present his case. There, he is branded an "enemy of the people" (*en folkefiende*) and is forced by an irate crowd to leave the meeting. Soon afterward, he is relieved of his position as the spa's medical director, his windows are smashed by angry mobs, patients desert his practice, his daughter is fired from her teaching job, and his family loses their home.

In solemn defeat, Dr. Stockmann plans to emigrate and live in isolation with his family, pining, "If only I knew where there was a virgin forest or a South Sea island for sale, cheap." A sympathetic sea captain offers the Stockmanns passage to "the West", but is fired by his company for collaborating with the doctor. Powerful neighbors then attempt to force the Stockmann to retract his words. He reacts angrily and, in apparent madness, resolves to stay and continue fighting in isolation, concluding, "...the strongest

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man in the world is he who stands most alone.” At the play’s end, the audience is saddened, knowing that going it alone does not confer strength and that the futures of the doctor, his family, and his town are dimming.

Are there lessons to be learned from this play? If so, how might such lessons inform our actions as scientists entwined in a world that both demands and, too often, rejects our expertise? Did the protagonist wrongly assume that facts and reason would prevail? That once his town’s citizens and leaders were made aware of a threat to their wellbeing corrective actions would be taken? Did he fail to understand that short-term financial interests of powerful forces might lead others to obfuscate reality, to discount his expertise, and to question his motives? Did his failures to recognize potential alliances and to build a community of support lead to his being branded an enemy rather than a friend of the town? This seems to me the case. And Stockmann’s is a path that 21st century scientists might retrace if we choose unwisely, as did he, to stand alone in our struggles to bring facts and reason to the fore. We cannot hope to succeed in our efforts if we avoid partnering with broader communities to assist in steering our ship’s course.

Editor-in-Chief Kate Lajtha (Lajtha 2017) has challenged us to find “... *new ways to allow our science to serve both other scientists and society in general.*” Three subsequent editorials in this journal have issued calls to action that should lead us to step to our ship’s helm. I concur with the journal’s editorial board (Lajtha and others 2017) “...*that current events are extraordinary and call for extraordinary measures*”, also with Bill Schlesinger (Schlesinger 2017) that “... *scientists are not advocates when their expertise informs the political process*”, and finally with Alan Townsend’s view (Townsend 2017) “... *that recent events in this country are only hitting the accelerator in the wrong direction.*” The question before us is, what’s to do?

I offer here some ideas, based on personal experience working with “extra-scientific” groups. That is, organizations where scientists sit at the table, but which are led by non-scientists whose collective expertise in policy, law, economics, planning, business, or communication can facilitate bringing science to inform policies and institute problem solving actions.

Personal engagement with groups working at the local and regional levels is a viable option. “All

politics is local” is a useful guiding phrase (phrase attributed to former (1977–1987) Speaker of the U.S. House of Representatives Thomas P. “Tip” O’Neill Jr), even in our digital age. Most of us live in communities where groups focused on environmental stewardship are active. Examples include lake associations, land and watershed conservancies, hunter-fisher clubs, and state branches of national environmental NGOs. Such groups need scientific advice and are nearly always welcoming of scientists. Engaging with them on a regular basis can serve to bring sound science, credibility, and confidence to these groups, and when it works well, positive outcomes. Such work can also enable us to forge connections with individuals and institutions that influence environmental policy development at higher levels.

I provide here one example of working with such a group. In 2006, several of us from Midwestern research universities partnered with the Chicago-based Environmental Law & Policy Center (ELPC) to form the ELPC Science Advisory Council. Our aim was to advise this non-profit public interest group on scientific matters underlying its environmental policy work in Great Lakes and Upper Midwest states. Our science council has now grown to include 12 members representing multiple areas of expertise including climate science, terrestrial and aquatic ecology, biogeochemistry, public health, toxicology, epidemiology, and social sciences.

We provide scientific expertise in support of ELPC’s efforts to (1) preserve valuable habitats in this large region, (2) promote climate change mitigation and adaptation efforts, (3) close obsolete coal-fired power plants responsible for particulate pollution and heavy metal contamination, (4) challenge the U.S. Forest Service in federal court to manage the Chequamegon-Nicolet National Forest for biodiversity and ecosystem services, (5) curb urban sprawl by resisting unnecessary “pork barrel” highway projects, (6) protect surface and ground waters, and (7) provide incentives and legal frameworks for developing clean energy and transportation systems. Potential new projects aimed at improving the sustainability and resilience of our region’s human-natural systems are often on the table for discussions of their scientific merits and feasibility. Those that excite our collective assembly of scientists and policy experts as having potentially high impacts are moved forward as new initiatives. Although our science group works without

financial compensation and, in many cases, without acknowledgement or reward from our home institutions, we proceed with satisfaction in knowing that our expertise is being used to advance not only our science, but to benefit our region and society in general.

This public interest organization's legal, policy and communications experts assist in framing our science for meaningful translation to the public. Outcomes include Congressional testimonies, op-eds in major news outlets, opportunities on broadcast media (television, radio, webcasts) to present scientific assessments of environmental risks, policy forums engaging scientists with agency heads and policy experts, and scientists' letters to elected officials in support of science-based environmental policies.

What's to do? Lots. But we won't succeed by succumbing to the delusion of Ibsen's protagonist that the strongest in the world are those choosing to stand alone in defiance of willful ignorance and conflicts of

interest. We won't win by talking only to ourselves and to other scientists, or by abdicating our responsibility to advocate for science as a problem-solving tool. Rather, we must recognize that successful navigation through politically treacherous waters requires taking turns at the helm of our larger community's ship.

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