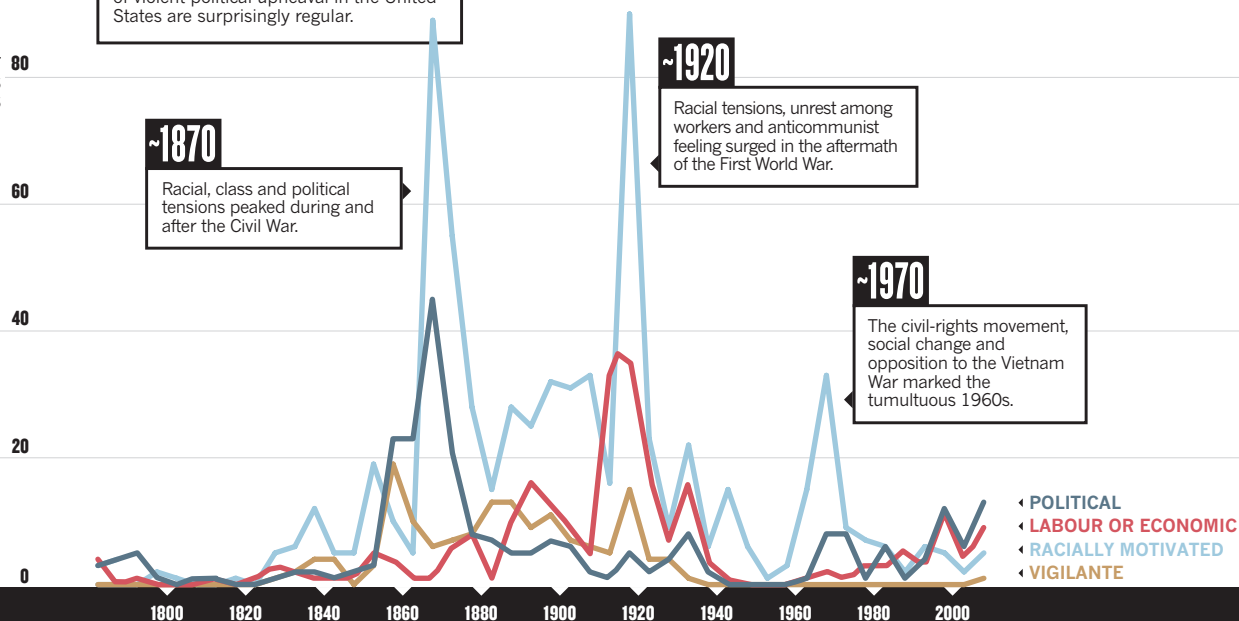


CYCLES OF VIOLENCE

The motivating issues vary, but episodes of violent political upheaval in the United States are surprisingly regular.

NUMBER OF
VIOLENT EVENTS
PER 5 YEARS



HISTORY AS SCIENCE

Advocates of 'cliodynamics' say that they can use scientific methods to illuminate the past. But historians are not so sure.

BY LAURA SPINNEY

Sometimes, history really does seem to repeat itself. After the US Civil War, for example, a wave of urban violence fuelled by ethnic and class resentment swept across the country, peaking in about 1870. Internal strife spiked again in around 1920, when race riots, workers' strikes and a surge of anti-Communist feeling led many people to think that revolution was imminent. And in around 1970, unrest crested once more, with violent student demonstrations, political assassinations, riots and terrorism (see 'Cycles of violence').

To Peter Turchin, who studies population dynamics at the University of Connecticut in Storrs, the appearance of three peaks of political instability at roughly 50-year intervals is not a coincidence. For the past 15 years, Turchin has been taking the mathematical techniques that once allowed him to track predator-prey cycles in forest ecosystems, and applying them to human history. He has analysed historical records on economic activity, demographic

trends and outbursts of violence in the United States, and has come to the conclusion that a new wave of internal strife is already on its way¹. The peak should occur in about 2020, he says, and will probably be at least as high as the one in around 1970. "I hope it won't be as bad as 1870," he adds.

Turchin's approach — which he calls cliodynamics after Clio, the ancient Greek muse of history — is part of a groundswell of efforts to apply scientific methods to history by identifying and modelling the broad social forces that Turchin and his colleagues say shape all human societies. It is an attempt to show that "history is not 'just one damn thing after another'", says Turchin, paraphrasing a saying often attributed to the late British historian Arnold Toynbee.

Cliodynamics is viewed with deep scepticism by most academic historians, who tend to see history as a complex stew of chance, individual foibles and one-of-a-kind situations that no broad-brush 'science of history' will ever capture. "After a century of grand theory, from Marxism and social Darwinism to

SOURCE: REF. 1

structuralism and postmodernism, most historians have abandoned the belief in general laws," said Robert Darnton, a cultural historian at Harvard University in Cambridge, Massachusetts, in a column written in 1999.

Most think that phenomena such as political instability should be understood by constructing detailed narratives of what actually happened — always looking for patterns and regularities, but never forgetting that each outbreak emerged from a particular time and place. "We're doing what can be done, as opposed to aspiring after what can't," says Daniel Szechi, who studies early-modern history at the University of Manchester, UK. "We're just too ignorant" to identify meaningful cycles, he adds.

But Turchin and his allies contend that the time is ripe to revisit general laws, thanks to tools such as nonlinear mathematics, simulations that can model the interactions of thousands or millions of individuals at once, and informatics technologies for gathering and analysing huge databases of historical information. And for some academics, at least, cliodynamics can't come a moment too soon. "Historians need to abandon the habit of thinking that it's enough to informally point to a sample of cases and to claim that observations generalize," says Joseph Bulbulia, who studies the evolution of religion at Victoria University of Wellington in New Zealand.

FROM ECOLOGY TO HISTORY

Turchin conceived cliodynamics during what he jokingly calls a midlife crisis: it was 1997, he was 40 years old, and he had come to feel that all the major ecological questions about population dynamics had been answered. History seemed to be the next frontier — perhaps because his father, the Russian computer scientist Valentin Turchin, had also wondered about the existence of general laws governing societies. (The elder Turchin's dissident writings about the origins of totalitarianism were among the reasons that the Soviet Union exiled him in 1977, after which he moved his family to the United States.)

What is new about cliodynamics isn't the search for patterns, Turchin explains. Historians have done valuable work correlating phenomena such as political instability with political, economic and demographic variables. What is different is the scale — Turchin and his colleagues are systematically collecting historical data that span centuries or even millennia — and the mathematical analysis of how the variables interact.

In their analysis of long-term social trends, advocates of cliodynamics focus on four main variables: population numbers, social structure, state strength and political instability. Each variable is measured in several ways. Social structure, for example, relies on factors such as health inequality — measured using proxies including quantitative data on life



Periods of rioting and upheaval have recurred roughly every 50 years in US history.

expectancies — and wealth inequality, measured by the ratio of the largest fortune to the median wage. Choosing appropriate proxies can be a challenge, because relevant data are often hard to find. No proxy is perfect, the researchers concede. But they try to minimize the problem by choosing at least two proxies for each variable.

Then, drawing on all the sources they can find — historical databases, newspaper archives, ethnographic studies — Turchin and his colleagues plot these proxies over time and look for trends, hoping to identify historical patterns and markers of future events. For example, it seems that indicators of corruption increase and political cooperation unravels when a period of instability or violence is imminent. Such analysis also allows the researchers to track the order in which the changes occur, so that they can tease out useful correlations that might lead to cause-effect explanations.

ENDLESS CYCLES

When Turchin refined the concept of cliodynamics with two colleagues — Sergey Nefedov of the Institute of History and Archaeology in Yekaterinburg, Russia, and Andrey Korotayev of the Russian State University for the Humanities in Moscow — the researchers found that two trends dominate the data on political instability. The first, which they call the secular cycle, extends over two to three centuries. It starts with a relatively egalitarian society, in which supply

and demand for labour roughly balance out. In time, the population grows, labour supply outstrips demand, elites form and the living standards of the poorest fall. At a certain point, the society becomes top-heavy with elites, who start fighting for power. Political instability ensues and leads to collapse, and the cycle begins again.

Superimposed on that secular trend, the researchers observe a shorter cycle that spans 50 years — roughly two generations. Turchin calls this the fathers-and-sons cycle: the father responds violently to a perceived social injustice; the son lives with the miserable legacy of the resulting conflict and abstains; the third generation begins again. Turchin likens this cycle to a forest fire that ignites and burns out, until a sufficient amount of underbrush accumulates and the cycle recommences.

These two interacting cycles, he says, fit patterns of instability across Europe and Asia from the fifth century BC onwards. Together, they describe the bumpy transition of the Roman Republic to the Roman Empire in the first century BC. He sees the same patterns in ancient Egypt, China and Russia, and says that they explain the timing of last year's Egyptian uprising, which took the regime of then-president

Hosni Mubarak by surprise. At the time, the Egyptian economy was growing and poverty levels were among the lowest in the developing world, so the regime could reasonably have expected stability. In the decade leading up to the revolution, however, the country saw a quadrupling of graduates with no prospects — a marker of elite overproduction and hence, Turchin argues, trouble.

Turchin has also applied this approach to other historical puzzles, such as how religions grow. Several models have been proposed. One is that they grow in a linear fashion as nonbelievers spontaneously 'see the light'. Another model holds that the number of converts increases exponentially, like infections with a contagious disease, as outsiders come into contact with growing numbers of converts. Using several independent proxies, Turchin has mapped conversions to Islam in medieval Iran and Spain, and found that the data fit the contagion model most closely². Using the same techniques, he has also shown that the model describes the expansion of Christianity in the first century AD, and of Mormonism since the Second World War.

Claudio Cioffi-Revilla, a computer social scientist at George Mason University in Fairfax, Virginia, welcomes cliodynamics as a natural complement to his own field: doing simulations using 'agent-based' computer models. Cioffi-Revilla and his team are developing one such model to capture the effects of modern-day climate change on the Rift Valley region in East Africa, a populous area that is in the grip of a drought. The model starts with a series of digital agents representing households and allows them to interact, following rules such as seasonal migration patterns and ethnic alliances. The researchers have already seen labour specialization and vulnerability to drought emerge spontaneously, and they hope eventually to be able to predict flows of refugees and identify potential conflict hotspots. Cioffi-Revilla says that cliodynamics could strengthen the model by providing the agents with rules extracted from historical data.

GLOBAL TRENDS

Cliodynamics has another ally in Jack Goldstone, director of the Center for Global Policy at George Mason University and a member of the Political Instability Task Force, which is funded by the US Central Intelligence Agency to forecast events outside the United States. Goldstone has searched for cliodynamic patterns in past revolutions, and predicts that Egypt will face a few more years of struggle between radicals and moderates and 5–10 years of institution-building before it can regain stability. "It is possible but rare for revolutions to resolve rapidly," he says. "Average time to build a new state is around a dozen years, and many take longer."

But Goldstone cautions that cliodynamics is useful only for looking at broad trends. "For some aspects of history, a scientific or cliodynamic approach is suitable, natural and fruitful," he says. For example, "when we map the frequency versus magnitude of an event — deaths in various battles in a war, casualties in natural disasters, years to rebuild a state — we find that there is a consistent pattern of higher frequencies at low magnitudes, and lower frequencies at high magnitudes, that follows a precise mathematical formula." But when it comes to predicting unique events such as the Industrial Revolution, or the biography of a specific individual such as Benjamin Franklin, he says, the conventional historian's approach of assembling a narrative based on evidence is still best.

Herbert Gintis, a retired economist who is still actively researching the evolution of social complexity at the University of Massachusetts Amherst, also doubts that cliodynamics can predict specific historical events. But he thinks that the patterns and causal connections that it reveals can teach policy-makers valuable lessons about pitfalls to avoid, and actions that might forestall trouble. He offers the analogy of aviation: "You certainly can't predict when a plane is going to crash, but engineers recover the black box. They study it carefully, they find out why the plane crashed, and that's why so many fewer planes crash today than used to."

None of these arguments, however, has done much to soften

scepticism among historians in general. The essential weakness of any attempt to make predictions based on trends, says Szechi, is the appalling patchiness of historical information. Records can be preserved or destroyed by chance: in 1922, for example, fighting in the Four Courts area of Dublin during the Irish Civil War led to a fire that destroyed the country's entire medieval archive. More generally, says Szechi, knowledge tends to pool around narrow subject areas. "We can tell you in great detail what the grain prices were in a few towns in southern England in the Middle Ages," he says. "But we can't tell you how most ordinary people lived their lives."

Concerted efforts are now under way to fill those holes. Harvey Whitehouse, an anthropologist at the University of Oxford, UK, is overseeing the construction of a database of information about rituals, social structure and conflict around the globe since records began. It is a huge undertaking, involving historians, archaeologists, religious scholars, social scientists and even neuroscientists, and it will take decades to complete — assuming that funding can be found beyond the UK government's current 5-year commitment. But White-

house believes that the research that is feeding the database will complement Turchin's approach by throwing light on the immediate triggers of political violence. He argues³, for example,

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"MOST HISTORIANS HAVE ABANDONED THE BELIEF IN GENERAL LAWS."

that for such violence to happen, individuals must begin to identify strongly with a political group. One powerful way for groups to cement that identification is through rituals, especially frightening, painful or otherwise emotional ones that create a body of vivid, shared memories.

"People form the impression that the most profound insights they have into their own personal history are shared by other people," says Whitehouse, who explored this fusion of identities in an as-yet unpublished survey of revolutionary brigades in Misrata, Libya, last December, along with his colleague Brian McQuinn, an anthropologist at Oxford who studies civil wars. Only once such fusion has occurred do people become willing to fight and die for the group, he says. Therefore, if Turchin's prediction of unrest in the United States around 2020 is correct, Whitehouse would expect the next few years to see an increase in tightly knit US groups whose rituals have a threatening quality but promise great rewards.

Turchin can't say who those groups might be, what cause they will be fighting for or what form the violence will take. Previous bouts of turbulence were not dominated by any one issue, he says. But he already sees the warning signs of social strife, including a surplus of graduates and increasing inequality. "Inequality is almost always a bad thing for societies," he says.

That said, Turchin insists that the violence is no more inevitable than an outbreak of measles. Just as an epidemic can be averted by an effective vaccine, violence can be prevented if society is prepared to learn from history — if the US government creates more jobs for graduates, say, or acts decisively to reduce inequality.

But perhaps revolution is the best, if not the only, remedy for severe social stresses. Gintis points out that he is old enough to have taken part in the most recent period of turbulence in the United States, which helped to secure civil rights for women and black people. Elites have been known to give power back to the majority, he says, but only under duress, to help restore order after a period of turmoil. "I'm not afraid of uprisings," he says. "That's why we are where we are." ■

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