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Whiteman, Noah K

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## The problem of interaction

Noah K. Whiteman

Department of Integrative Biology and Department of Molecular & Cell Biology, University of California, Berkeley

### Abstract

As we look to the next 75 years, I recount how the socio-political milieu in which the Society for the Study of Evolution (SSE) and the journal *Evolution* were formed in 1947 was a “problem of interaction.”

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Mayr’s “problem of interaction” (Mayr 1947; Whiteman 2022) in the foreword to the first issue of the journal *Evolution* can be a useful lens with which to view the evolution of our field. When inviting me to participate in the 75<sup>th</sup> Anniversary Symposium of the SSE’s Annual Meeting in 2021, the symposium’s organizers, Ruth Shaw and Maria Rebolleda-Gómez, wrote:

We are hoping to take a critical view of the history of evolutionary biology, recognizing the work and ideas that came before us, as well as the ways in which our discipline is changing and should keep evolving.

With that guidance in mind, I examined the contents of the first issue of this journal, *Evolution*. This led me to wonder about the way these articles were solicited, the authors, their affiliations and connections to Mayr. As I pressed for more information, it became clear that the socio-political milieu of the years around 1947 needed to be taken into account. This implies that there was interaction between the SSE’s evolution, including the journal, and society at large.

I share what I found, which will return us to the “problem of interaction” but on a completely different plane. Please bear in mind that I am not a historian and what I report has largely been covered in various sources previously, but it is useful to synthesize some of them in light of the SSE’s 75<sup>th</sup> anniversary. I do not contend that there are new insights here, but nonetheless, the connections I found surprised me and are of interest as we consider how far we have come. I rely heavily on three works by Smocovitis as a source of information on the formation of the SSE and journal as well as Mayr’s role therein (Smocovitis 1994a,b, 2020).

In 1947, President Harry Truman, through the anti-Communist Truman Doctrine, signed the National Security Act, which created the Central Intelligence Agency, the Joint Chiefs of Staff, the Department of Defense, and the National Security Council. Walter Lippmann’s book entitled *Cold War: A Study in U.S. Foreign Policy* was published that same year,

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Corresponding author details: whiteman@berkeley.edu .

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creating a new moniker that would be used to describe the long detente with the U.S.S.R that lasted until 1991 (Locke and Wright 2019). Fearing post-World War II Western Europe would fall completely under the spell of Stalin, The European Recovery Program (ERP), or Marshall Plan, was implemented by Truman’s State Department. As fear of Communism took hold in the U.S. the House of Representatives Un-American Activities Committee began investigating the Hollywood film industry for its suspected ties to the Communist Party—hundreds were barred from work by the big studios, including Orson Welles and Charlie Chaplin (Schrecker 1994).

Truman also signed Executive Order #9835, which became known as the “Loyalty Order,” designed to remove Communists or “sympathizers” from the federal workforce. It required investigations into each employee of the U.S. Federal Government and applicants thereto (Schrecker 1980). These events would eventually lead to the resignations and sacking of thousands of federal employees. The Lavender Scare (Lavender refers to LGBTQIA+ identities) began in parallel in 1947 (Johnson 2009), which was coupled to the Loyalty Order but focused initially on the State Department, later expanding to the entire federal government (Adkins 2016). It began when the Senate Appropriations Committee sent a memo to Secretary of State George Marshall indicating that they had evidence of “extensive employment in highly classified positions of admitted homosexuals who are historically known to be security risks.” The McCarran rider on the appropriations bill gave the power to purge “admitted homosexuals” from the federal government (Blumenfeld 2006). The rise of Wisconsin Senator Joseph McCarthy soon followed, which eventually led to President Dwight Eisenhower’s Executive Order #10450 in 1953. It banned LGBTQIA+ people from federal employment under the guise of its “sexual perversion” clause (Shibusawa 2012) and resulted in the dismissal of about 5,000 federal employees during the course of its implementation, which was not fully lifted until 1995 when President Bill Clinton issued Executive Order #13764. More suspected LGBTQIA+ federal employees were terminated than suspected Communists while the Eisenhower ban was in effect (Sears et al. 2009).

Meanwhile, the American Association of University Professors in 1947 affirmed a report from its Committee on Academic Freedom that stated (Gardner 1967): “There is, then, nothing in the nature of the teaching profession which requires the automatic exclusion of Communists.” However, this guidance was ignored as universities were swept up in the Red Scare. Two years later, just as the SSE and its journal were still trying to get off the ground, the University of California Board of Regents implemented its own loyalty oath, proposed by then UC President Robert Sproul. Many faculty and students pushed back, but employees of the Radiation Laboratory at Berkeley, which was leading the development of nuclear weapon technology, were also scrutinized by the House’s Un-American Activities Committee (Gardner 1967).

The first UC Berkeley employee to be fired for suspected Communist activities was a graduate student (a Teaching Assistant in Physics) and the second, a non-academic staff member at UCLA (Finacom 2006). Eventually, 31 UC faculty were terminated for not signing the loyalty oath. Although hundreds had been recommended for a similar fate in the lead up, most eventually relented and signed the oaths under duress. At issue was more than free speech and academic freedom—the question of shared governance of the University

between the Administration and the Faculty Senate was one of the principles guiding many who refused to sign. UCLA Professor David Saxton refused to sign and was terminated in 1950. He later became the President of the University of California and then, Chairperson of the MIT Corporation (Atkinson 2006).

As sordid as this affair was, the ensuing court battles and eventual California Supreme Court-mandated reinstatement offers in 1952 to those faculty who were dismissed buttressed nascent tenure protections that had not yet been fully tied to the First Amendment (for government employees of public universities at least) in the courts, but would be. At the University of California, my personal impression is that it also may have had the effect of fortifying the tradition of shared governance.

The Red Scare, Lavender Scare and subsequent intersection with the academy and the constitutionally-guaranteed rights of university faculty in the U.S. may at first blush seem tangential to the 75<sup>th</sup> Anniversary Symposium and Mayr's focus on the importance of "interactions." However, the foundations of our modern synthetic field of evolution arose within the particular socio-political milieu at the time. After all, in 1859, the same year that *On the Origin of Species* was published, it was also effectively banned from Trinity College at Cambridge University (Darwin 1887), where Charles Darwin studied. Darwin's and Alfred Russel Wallace's dangerous idea was inherently political because it transformed what it meant to be human and most importantly, what it didn't mean.

It is remarkable that it took 88 years from 1859 for a journal devoted to evolutionary biology to appear. Why the long fuse? What was it about the 1940s? In 1942, Julian Huxley, grandson of Thomas Huxley ("Darwin's Bulldog") published his book *Evolution: The Modern Synthesis*. In 1939, he attended the American Association for the Advancement of Science (AAAS) meeting in Columbus, Ohio and suggested to the *Drosophila* geneticist Theodosius Dobzhansky (born in Ukraine), the botanist Carl Epling (born in Illinois) and ornithologist Ernst Mayr (born in Germany) that a new society should be created specifically to tackle questions of speciation (Smocovitis 1994a,b).

Alfred Emerson at the University of Chicago shortly thereafter led the informal Society for the Study of Speciation (SSS) and published some articles. Separately, through the aegis of the National Research Council, the Committee on Common Problems of Genetics, Paleontology and Systematics was created. Two meetings in 1943, one including botanists at UC Berkeley and the other of geneticists and paleontologists at Columbia University and the American Museum of Natural History. Among the leaders was Mayr, who edited some articles that arose from correspondence among the committee's members. As a result of all of this, these nascent evolution societies merged into one, the SSE. As "synthetic evolution" was ready to emerge from balkanized sub-disciplines at the end of World War II (Smocovitis 1994a,b).

Mayr and Julian Huxley had a long series of exchanges over the potential of a joint British-North American international evolution society and a pair of journals. In parallel, Mayr was also navigating whether the *American Society of Naturalists* would become the new home for the society and journal instead. Neither alternative won the day and in the

end, to Huxley's disappointment, they forged ahead with a North American-based society and journal. Largely under Mayr's leadership the new SSE and its journal, *Evolution: International Journal of Organic Evolution*, were born. Emerson led the first SSE meeting in 1946 and George Gaylord Simpson was elected as its first President, with Mayr as Secretary and Dobzhansky among the Council members (Smocovitis 1994b).

The botanist Carl Epling was one of the three co-founders of the SSS and faculty at UCLA. By 1950 he was Vice Chair of the southern section of the UC Academic Senate. Just a few years after 1947, the Red Scare had enveloped even him. His reaction in 1950 (Shetty 2018) to the decision by the UC Board of Regents to implement the loyalty oath revealed a conviction to shared governance: "I am deeply shocked that 12 Regents should take so uncompromising and intolerant an attitude toward the carefully considered recommendations of the Senate to reach this common objective." This was not a trivial statement given that the faculty expressed through a ballot initiative that they were, four to one, *in favor* of the university banning employment of Communists (Finacom 2006). The faculty were largely sympathetic to the Regents' anti-Communist stance, but were opposed to being forced to take a special oath foisted upon them by the legislature via the Regents.

In parallel, Mayr left the Weimar Republic in 1931 to work at the American Museum of Natural History. Soon, however, he faced anti-immigrant sentiment. Shortly after the U.S. declared war on Hitler's Germany, Mayr's family home was raided by the FBI and he and his wife Margarete were arrested under the revised Alien Enemies Act and President Franklin Roosevelt's presidential proclamations #2525 (Japanese), #2526 (German), and #2527 (Italian). However, their daughters were U.S. citizens by birth, which, according to Mayr, may have prevented them from being sent to U.S. internment camps (Mayr 1997a). In 1947, their applications for U.S. citizenship had been delayed. When Mayr inquired, he was told by immigration officers in New York that it was because of his occupation as an intellectual and his nationality as a German (Mayr 1997b). Mayr then sued the U.S. Immigration and Naturalization Service to challenge the delay and eventually became a citizen. Xenophobic sentiment in post-war America affected Mayr's life and career.

Meanwhile, Dobzhansky had long been in the U.S. He left Russia in 1927 after receiving a Rockefeller Foundation fellowship to work with Thomas Hunt Morgan at Columbia University (Ayala 1985). Dobzhansky would also intersect with the rise of Stalinism, but in a different way. In 1946 he wrote with his collaborator Leslie Dunn, the book entitled *Heredity, Race and Society* which aimed his formidable intellect at the critique that genetics as a field was inherently racist, a pillar of Trofim Denisovich Lysenko's pseudoscientific (neo-Lamarckian) ideas on inheritance that were embraced by Stalinists (Gordin 2012). What was more, he actually translated Lysenko (1946) into English with edits provided by none other than Carl Epling (Dunn 1946). This was apparently covertly done to bring geneticists in the West up to speed on the pseudoscience being embraced in the Soviet Union. Dobzhansky anticipated it would lead to a take-down of Lysenko's ideas in the literature, which would aid the plight of the many geneticists in the U.S.S.R. who were at the top of their field, including those who had trained Dobzhansky, and were discreetly asking for help in correspondence with him. Dobzhansky then devoted substantial energy to both the formation of the new SSE and journal *Evolution* as well as subverting the injection of

Marxist political ideology into the field of genetics by Stalinists. The goal of Lysenko was to replace genetics with Michurinism, so-named after the crop breeder Ivan Vladimir Michurin whose research on hybridization and tree grafting was the supposed basis for Lysenko's pseudoscientific and discredited theory of acquired inheritance, which has seen a recent resurgence (Kolchinsky et al. 2017).

Returning to the 75<sup>th</sup> Anniversary theme and Mayr's "problem of interaction," evolutionary biology is a guiding light in a world besieged by an undesired interaction: ours with the SARS-CoV-2 virus that has caused a pandemic continuing to rage. Yet, there is concern that science is becoming more and more politicized (Druckman 2017; Varadarajan 2021). The late Richard Lewontin, whom we also lost this year, reminds us that (ZXEducation 2012): "...science, like any other productive activity, like the state, like a family, like sport, is a social institution, and as such, it is completely integrated into and influenced by the rest of our social institutions." Evolution is part of science, science is a product of our society and shapes it too. Science is inherently, "a problem of interaction."

Societal forces have also shaped the SSE and our science. Apropos of that, one of the informal societies in the Bay Area that was officially tied to Emerson's SSS was called *The Biosystematists*. This group of 20-30 men included David Keck, Jens Clausen, William Hiesey as well as E.B. Babcock, G. Ledyard Stebbins and Lincoln Constance (Smocovitis 1994). Women and graduate students were excluded until the early 1970s. More generally, of the 58 attendees of the first official meeting of the SSE in 1946 only one was a woman: Ruth Patrick. Patrick would go on to lead the Limnology Department of the Philadelphia (now Drexel University) Academy of Natural Sciences and was elected to both the American Philosophical Society and the National Academy of Sciences. She was also the first woman elected President of the American Society of Naturalists and was subsequently awarded the National Medal of Science from President Clinton. Patrick authored over 200 scientific papers and books on diatoms, groundwater contamination, and rivers (Bott and Sweeney 2014).

In 1947, Princeton University invited the SSE to hold its first scientific meetings on its campus and would end up helping to foot the bill. Although Patrick had attended the 1946 meeting, the slightly more exclusive Princeton meeting in 1947 would include only men (Smocovitis 2012) from North America (but none from Mesoamerica), Europe and the U.S.S.R. Biologists from countries in Africa, Asia (excluding the U.S.S.R.), Oceania, and South America were not represented. Notably, in the first issue, Mayr (1947) stated: "Contributions will be accepted on the basis of merit regardless of the country of origin."

It is now useful to examine both the authors and the subjects of the first issue of the journal in 1947. The titles of many of the articles could, perhaps surprisingly but also strangely reassuringly, just as well be found today in any of our contemporary evolutionary biology journals. The first article was sole-authored by Dobzhansky (Columbia University) and was entitled "Adaptive changes induced by natural selection in wild populations of *Drosophila*." The next, on reproductive biology of the *willistoni* group of *Drosophila* was by Herman Spieth (Columbia University). The third was by R.A. Stirton (UC Berkeley) who presented a paleontological study on the evolutionary rates of the height of the crowns of mammal teeth.

Philip Truman Ives (Amherst College) wrote the next article, on chromosomal inversions in *D. melanogaster*. The fifth was a comparative chromosomal study across species in the *guarani* group of *Drosophila* by James C. King (Columbia University). Next was an article on Hawaiian Honeycreepers by Dean Amandon (American Museum of Natural History) and two on plants, one on hybridization in sages (*Salvia* spp.) by Carl Epling (UCLA) and one on hybridization in oaks (*Quercus* spp.) by G.L. Stebbins Jr. (UC Berkeley), E.B. Matzke (Columbia University) and again, Epling. Three-spined sticklebacks even made an appearance in “Experimental studies on adaptive evolution in *Gasterosteus aculeatus* L.” by M. J. Heuts from the University of Louvain, Belgium. The last article was by Warren P. Spencer on genetic drift in *D. immigrans*. Finally, Irwin H. Herskowitz (Columbia University) wrote a Notes and Comments on a method for treating *Drosophila* gametes with chemicals.

From this set of papers it is clear that there is a heavy *Drosophila* tilt to the research—which quickly became a point of contention (Smocovitis 1994a,b). Although Mayr was aware of the problem, it took some time to mitigate and not before pointed letters about it arrived in his mailbox from Simpson on the paleontological side and from the botanists. Mayr apparently had a difficult time wrangling authors for the new journal and took a hands-on approach (Smocovitis 1994b).

The elite nature of the institutions represented in the first issue and the dearth of many other axes of human diversity among the authors is not surprising given the socio-political context. The SSE was forged in the late 1940s U.S. and its paucity of civil rights for women and minoritized people.

Widespread racism and codified discrimination against Black/African Americans under Jim Crow in the South and similar practices in the North (Sokol 2014) heavily impacted opportunities for Black/African Americans in evolutionary biology (Byrnes 2015; Graves 2019; Lee 2020). Anti-Japanese racism and xenophobia resulted in the internment of over 120,000 Japanese Americans, including geneticists (Smocovitis 2011). As Mayr nearly experienced himself, thousands of German and Italian Americans were also sent to internment camps. On the heels of this, Dillon S. Meyer, who led the relocation of Japanese Americans as Director of the War Relocation Authority, pushed an assimilation program designed to encourage Native Americans living on reservations to move to cities (Nesterak 2019). Jewish students and faculty were subjected to infamous admission and hiring quotas throughout the U.S. university system as well (Lipset and Ladd 1971). Finally, banishment from the Federal Government of a smaller number of suspected Communists in the Red Scare and a much larger number of LGBTQIA+ people in the Lavender Scare led to the loss of thousands of professional opportunities and any future contributions to the nation from these individuals.

The purpose of the above discussion is not to cast judgement upon the first officers of the SSE, the organization of the first meetings, or the cross-section of authors in the first issue of the journal. We owe a debt of gratitude to the founders, especially Ernst Mayr, who worked so tirelessly in its creation at a time rife with both post-War opportunities and socio-political challenges.

Still, it is important to recognize how far the SSE has come in terms of who is encouraged to participate in our meetings and journals, the broad demographic and institutional profiles of its members and leadership, as well as the scope of the journals. Although there has been much progress, but there is much more to be done (Wellenreuther and Otto 2016; Graves 2019; Schell et al. 2020; Rushworth et al. 2021).

On the positive side, the SSE's policy of allowing every graduate student to give an oral presentation at its annual meeting is an example of how the elitism that defines the academy and is so deeply tied to socio-economic factors can be productively countered (Clauset et al. 2015). Such efforts are important because it is the work environment, as opposed to selection effects, that primarily determine average productivity and prominence of academic scientists in the United States (Way et al. 2019). Given the importance of opportunity as a determinative factor, elitism is clearly a "problem of interaction" that we should continue to address in the SSE and science as a whole.

History will judge how the SSE responds to the changing needs of its members, prospective members, authors, and society, as it evolves from its 1946 Bauplan.

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