

SUBJECT INDEX

A

Academic careers: for chemistry students, 150–151; history monographs and, 341; job crisis for humanities, 392–394; limited positions in, 47, 48–51; for mathematics students, 108–110; in neuroscience, 208–209, 221; non-academic vs., 25–26; oversupply of historians for, 299–300; preparing English students for, 352, 353; student preparation for classroom teaching, 81–82; teaching assistantships as preparation for, 324, 345–346

ACS Directory of Graduate Research, 171

Admission policies, 362, 368n2

Adviser-student relationship, 200–201

Age, 192–193

American Heritage Dictionary, 252

American Higher Education (Beard), 309n2

American Scholar, The, 404

“American Scholar, The” (Emerson), 298

“Analysis and the Complex Problem of Intellectual Influence” (Zuckerman), 92n1

Apprenticeships: graduate education as, 141; “master”/“apprentice” concept, 305; not working in English, 372; postdoctoral, 48, 49, 50, 158; retained in history doctorate, 346–348; suggestions for teaching, 153–154

“Are There Too Many Ph.D.’s in Mathematics?” (Duren), 117n2

“Art as a Cultural System” (Geertz), 88

“Assessing Research-Doctorate Programs” (Ostriker and Kuh), 94n21

At Cross Purposes (Golde and Dore), 94n21

At the Helm (Barker), 164n14

Attrition: questions about, 422–423; student, 5, 187, 193; women and minorities in English programs, 360

B

Behaviorism in educational psychology, 278

Beliefs and misconceptions, 258, 266

Beyond the Culture Wars (Graff), 388

Beyond the Molecular Frontier (National Research Council), 167

Big ideas in educational psychology, 277–279

Bioengineering, 222–223

Biological sciences, 92n2

British Ph.D. programs, 59, 147–148, 163n5

C

Career counseling, 130, 131

Career paths: academic vs. nonacademic, 25–26; in doctoral programs, 49–50; education, 246; educational psychology, 282–285; employment in neuroscience, 208–209; English, 352, 353, 386–387; history,

- 299–300, 323–324, 341; increasing numbers of talented students, 56–57; job crisis for humanities, 392–393; limited academic employment, 47, 48–51; mathematics, 99, 124–125, 130; mismatch between training and, 26, 27, 151; neuroscience, 208–209, 221; postdoctoral apprenticeships, 48, 49, 50, 158; preparing for nonacademic careers, 51–53, 66, 81; statistics on employment, 93n14; tracking students', 54–55. *See also* Postdoctoral employment; Profession
- Carnegie Initiative on the Doctorate (CID): about, 6; assumptions of, 7–9, 420; benefits of multidisciplinary studies, 8–9; departments, 8; disciplines and departments included in, 6–7; evaluating postdoctoral careers of students, 55; grounding study in disciplines, 7–8; non-Ph.D.'s absent on board of, 60; PART acronym, 426; products of, 7; responsibilities of stewards, 74–75
- Challenges: chemistry and chemical engineering, 167–170; facing doctoral education, 18–20; in neuroscience, 221–224, 227–230, 240–243; within disciplines, 25–29
- Change: demographic influences on doctoral programs, 56; in discipline and profession of history, 299–300; expanding definitions of literature, 363–365; faculty's resistance to, 34–35, 37; in focus of historical scholarship, 300–303; gauging effectiveness in student careers, 54–55; historical trends in graduate education, 4; ideas as incentive for, 8; implementing teaching apprenticeships, 153–154; involving graduate students in, 40–41; involving untenured faculty in, 43–44; needed in faculty attitudes and habits, 427; pressures for in mathematical discipline, 103; proposed for chemistry programs, 195–200; proposed for natural sciences, 89–91; rethinking foundations of discipline, 79; scientific revolutions and, 69–70; within English discipline, 371–372, 380–387
- Charlotte's Web* (White), 403
- Chemical and Engineering News*, 144, 170
- Chemical engineering, 167–170
- Chemistry: challenges posed for chemical engineering and, 167–170; communication skills needed, 182–183; cooperation required in, 188–189; costs of proposed internships, 159–161; developing breadth of knowledge, 174–178, 196–199; developing leaders, 190–191; developing professional skills in, 181–186; discipline of, 135; empowering students in, 193–194; evaluating professional skills and knowledge offered, 143–146; exam system for, 177; final thesis in, 180–181, 199–200; focusing students on research advances, 180; foreign language skills in, 183–184; ideals of scholarly training in, 142–143; instruction in ethics, 185; interdisciplinary research in, 177–178; inviting outside lecturers, 176–177; leadership required in, 189–190; learning history of discipline, 154, 158; management and personnel skills needed in, 155, 159; mathematical framework for research in, 126; numbers of working and Ph.D. recipients in, 135–136; organizing curricula for,

- 175–176; preparing students for faculty career, 150–151; profiles of students in, 191–193; proposed changes for program, 195–200; research on substances, 172; research proposals in, 179–180; reward systems in programs, 202–204; shortening time-to-degree in, 149; stimulating creative research, 179, 195–196; strategies for implementing change in, 157–162; student research in, 178–179; subfields within discipline, 171; suggested enhanced curriculum for, 161, 162; suggested reforms for future faculty, 152–162; taking nontraditional paths in, 187–188; teaching vs. research, 149–150; transformation of substances, 172–173; viewing education as profession, 153
- Chemists: students joining lab of, 136–137; time-to-degree for, 136, 145–150
- Children, 193, 205n1
- Chronicle of Higher Education*, 362
- Classical Mechanics* (Goldstein and others), 72
- Collaborative practice, becoming team players, 53
- Collaborative practices: benefits of, 131; in English, 365, 366; in humanities, 410; research groups, 131–132, 155, 159
- “Common Sense as a Cultural System” (Geertz), 88
- Communication skills: communicating profession to public, 80–81, 82; grant writing, 157, 159, 231–232; importance of theses, 53; needed by chemistry students, 144; oral and written, 182–183; providing students with, 52–53; writing for publication, 266. *See also* Professional skills; Writing
- Community of practice: creating guild of historians, 334–338; doctoral training as entering, 275; guild definition and, 337
- Competition: among faculty, 83; between faculty and students, 39–40
- Comprehensive exams, 78, 89–90
- “Conference on the Future of Doctoral Education,” 366
- Conflict: obscuring areas of, 370; organizing courses around, 380–382, 400; wrestling with, 373–374
- Conflict of interest, 156
- Conservatism: conserving important ideas, 10–11; studying discipline’s innovation and, 82–84; tenure and faculty, 35–38
- Context: education and cultural, 271–273, 279–281; historical research into, 330, 331
- Contradictions: cultural influences leading to, 69–70; incomplete paradigms and theories in sciences, 71–72; scientific method and, 71; within disciplines, 67, 68, 69–71, 92nn3, 4
- Controversy: contested issues in English, 370, 373–374, 380–382; in history, 325–326; over unified scientific method, 71
- Creativity, stimulating in research, 179, 195–196
- Critical Inquiry*, 413–414n13
- Critical thinking: art of synthesis, 306; crucial element in education discipline, 261; learning to improve arguments, 344; risk and rigor in natural sciences, 73–76; training students in, 87. *See also* Independent thinking
- “Crucial Elements of Scholarly Inquiry and Student Learning,” 261–263

- Culture wars within humanities, 396–397
- Curing untreatable diseases, 168–169
- Curriculum: chemistry, 137, 157–162, 175–176; current neuroscience, 213–216; history, 292, 303–304, 320–325; innovative changes for sciences, 89; making time for student learning, 90–91; organizing around controversy, 380–382, 400; Ph.D.'s participating in K-12 mathematics, 125; required courses on scientific method, 86; requirements of English, 368–369n3; students' views of, 42–43
- D**
- Departments: commitment to teaching and writing, 370–371, 376–377, 383; considering change within, 43–45; fostering culture within, 347; grounding study in, 8; included in CID, 7; size of English, 351–352; starting *de novo* with, 421; stewardship of mathematics, 113; structure of history, 338
- “Developing Scholars and Professionals” (Bass), 99
- “Development of the Space-Time View of Quantum Electrodynamics, The” (Feynman), 93n13
- Dictionary of the History of Ideas* (Frankena), 252
- Disciplines: assumptions about, 420; avoiding difference in, 299; benefits of multidisciplinary studies, 8–9; challenges within, 25–29; chemistry, 135; communicating profession to public, 80–81, 82, 299; connecting with responsibilities beyond classroom, 27–28; contradiction within, 67, 68, 69–71, 92n3, 4; defined, 101–102; defining English, 351, 378–380; defining knowledge for, 68; designing doctoral program *de novo* by, 424; determining rigorous research in, 75–76; doctorates awarded by, 93–94n17; exploring scholarship beyond specialization, 77–79; exposing students to other, 154–155; flexibility of intellectual heritage, 298; grounding study in, 7–8; history topics overlapping with other, 301–302; included in CID, 6–7; interdisciplinary challenges for, 29–31, 227–230; learning history of, 154, 158; mathematics, 97–100; merging with history, 327–329; messiness of humanities, 391–400; principles of, 297–299; realigning humanities, 409–410; reform and stewardship of, 32; regularly rethinking foundations of, 79; role of history, 336; shared values of historians, 329–334; starting *de novo* with, 421; steward of, 12, 13; studying innovation and conservatism within, 82–84; subfields within chemistry, 171; understanding diversity of careers in, 58–59; unity within humanities, 400–403; viewing as means in research, 298; wrestling with conflicts in, 373–374, 379. *See also* Specialization; and *specific disciplines*
- Dissertations: English, 352, 368–369n3; history, 292–293, 324–325, 340–343; mathematical, 98; mentoring students while writing, 325. *See also* Theses
- “Do Babies Matter” (Mason and Goulden), 205
- Doctor of Philosophy, 101
- Doctoral education: asking new questions about, 421–423; building new model of, 423–426; challenges of

- multidisciplinary fields, 240–243;
 conservation of important ideas,
 10–11; developing depth and breadth
 of training, 79–80, 174–178, 196–
 199; generation of new knowledge,
 10; history of, 3, 122; improving
 mathematics, 128–132; incomplete
 paradigms and theories in sciences,
 71–72; James' opposition to, 335,
 336; “master”/“apprentice” con-
 cept of, 305; in mathematics field,
 97–100; shortcomings of programs,
 5; traditions of mathematical, 104;
 training professional generalists for
 history, 338–340; transformation
 of knowledge, 11–12. *See also* Edu-
 cation; Education (as discipline);
and specific disciplines
- Doctoral programs: British, 59,
 147–148, 163n5; career paths in,
 49–50; common challenges facing,
 18–20; conservatism of faculty, 35–
 38; creating professional guild of
 historians, 334–338; creating stu-
 dent-centered, 204, 424–426, 427,
 428; “Crucial Elements” table for,
 264–265; defining research prob-
 lems in, 76–77; demographic shifts
 and influence on, 56; design of
 mathematics, 115–116; developing
 leaders, 190–191; doctorates
 awarded by discipline, 93–94n17;
 emergence of neuroscience field,
 233–234; emphasizing student
 needs in, 46–48; ensuring relevance
 of, 47; entering community of
 practice via, 275; expanding educa-
 tional psychology, 286; expanding
 pool of applicants, 192–193, 194;
 fostering networking, 51–52, 166;
 German, 148, 151–152, 163nn9,
 10; goals for sciences, 73; inclusive
 admission policies for, 362, 368n2;
 innovations for sciences, 89–91;
 introductory seminars in, 78–79;
 Japanese, 60; mathematics' influ-
 ence on other, 102–104; need to
 rethink, 94n21; in neuroscience,
 207–208, 213–217, 218–221, 239–
 240; PART acronym describing,
 426; Ph.D. and Ed.D. in education,
 247; postdoctoral apprenticeships,
 48, 49, 50, 158; questions for
 humanities, 407–412; reduced size
 of humanities, 394–395; responsi-
 bility for reform in, 23–25; short-
 ening, 59, 149; signs of success in
 mathematics, 120; size of history
 departments, 292; soliciting gradu-
 ate's input on, 55; special chal-
 lenges in natural sciences, 65–66;
 time-to-degree, 49, 129, 146–147,
 149; using essays to enliven,
 17–18; value of humanities, 412.
See also Time-to-degree; and spe-
 cific disciplines
- Doctoral students. *See* *Students*
- Documenting history, 330
- ## E
- Economic Interpretation of the Con-
 stitution, An* (Beard), 297
- Economics: economic demands on stu-
 dents, 42; neuroeconomics, 224;
 salaries and oversupply of Ph.D.'s,
 57. *See also* Funding
- Education: acknowledging sociocul-
 tural influences on, 271–273;
 apprenticeships in graduate, 141;
 challenges of science, 65–66; defini-
 tions of, 252; as discipline and
 enterprise, 254–255; educating his-
 torians, 305–307; German *habilita-
 tion* concept, 151–152, 163nn9,
 10; historical changes in, 4; post-
 World War II expansion in, 312–313;
 as profession, 153; shortcomings of

- doctoral programs, 5; understanding cultural context of K-12, 279–281; U.S. vs. European, 148. *See also* Doctoral education; Education (as discipline); Teaching; Undergraduate education
- Education (as discipline): beliefs and misconceptions in, 258, 266; definitions of education, 252; field of study and enterprise, 254–255; formal knowledge within, 255–257, 260–265; influence of educational psychology in, 268; inquiry and learning in, 260–266; methodologies in, 259–260; overview of, 245–249, 253–254; practical knowledge within, 257, 265–266; practice and research in, 247; women and minorities in, 245–246. *See also* Educational psychology
- Education of Historians for the Twenty-First Century, The* (Hofstadter and Smith), 309n3
- Educational psychology: addressing multicultural issues, 286–287; emphasizing learning in context, 271–273; evolution of, 268–273; failures of educational research, 272–273; improving training in technology, 285–286; including brain research in, 286; internships in complex environments, 281–282; introducing students to context of education, 279–281; methods courses in, 273–277; practicums in, 280–281; presenting big ideas in, 277–279; specialization in, 287–288; understanding educational policy, 282–285
- Elements of Chemistry* (Lavoisier), 154
- Elephants Teach, The* (Myers), 385
- “Employment Sector, Salaries, Publishing, and Patenting Activities of S&E Doctorate Holders” (Hoffer), 93n14, 93–94n17
- Energy sources, 169
- English: assigning faculty to freshman composition, 383; career paths in, 352, 353; changes within discipline, 371–372; collaborative projects in, 365, 366; commitment to teaching and writing in, 370–371, 376–377; confusion among students in, 371–372, 374–375; curriculum requirements in, 368–369n3; defining discipline of, 378–380; definitions of literature in, 363–365; dissertation in, 352, 368–369n3; joint programs with high school teachers, 385–386; linking graduate study with undergraduate research, 383–385; nonacademic career paths in, 386–387; obscuring areas of conflict and consensus in, 370; organizing courses around controversy, 380–382; paternalism toward women in, 357–359; patronizing attitudes toward minorities, 359, 360–362; pedagogy circles, 366–367; requiring courses on teaching, 382; scope of discipline, 351; size of departments of, 351–352; teaching assistantships in, 352–353, 367, 375–376; teaching creative writing, 385; wrestling with conflicts in, 373–374, 379
- Epistemologies: confronting epistemological issues of knowledge, 65–66, 67; nature of historical knowledge, 296–297; shaping research, 275
- Errors and Expectations* (Shaughnessy), 377
- Essayists: about, 15; summary of views, 419–420
- Essays: assume disciplines will remain intact, 420; descriptions of stewardship and, 9–14; how to use, 17–18; learning from, 16–20; organization within book, 15–16; as

- product of CID, 7; questions framing, 9; themes across, 18–20
- Ethics: instruction in chemistry programs, 185; sensitizing faculty to, 156; training in, 144, 145, 159
- Etic/emic views, 274
- Exams: changes for English, 365–366; exam system for chemistry, 177; mathematical qualifying, 98; preliminary neuroscience, 216–217; structure of history, 292; thesis defense, 181; time period following comprehensive, 78, 89–90; watching students perform poorly on, 306
- Expert learners, 190
- “Extraordinary Convergence, The” (Lanham), 414n17
- ### F
- Facts in history, 317–318, 332
- Faculty: changing in attitudes and habits, 427; competing with students, 39–40; competition and loyalty among, 83; cultivating next generation of historians, 304–305; developing leadership skills of, 156–157; English department, 351–352; ethics training for, 145, 156, 159; evaluations of advising by, 42; explaining tenure issues to, 156; grant writing skills, 157, 159; institutionalized conservatism of, 35–38; involving untenured, 43–44; learning how universities function, 155–156; management and personnel skills needed, 155, 159; mentoring students, 38–40, 347; minorities and women as, 203–204; number of students becoming, 50; resistance to change, 34–35, 37; rethinking role of, 91; teaching breadth and depth of discipline, 196–199; teaching vs. research, 149–150; understanding diversity of career paths, 58–59. *See also* Mentoring
- Failures of educational research, 272–273
- Five stages of fame, 39
- Flexibility of intellectual heritage, 298
- Foreign language skills, 183–184
- Formal knowledge, 255–257, 260–265
- “From Academic Knowledge to Democratic Knowledge” (Bender), 309
- Funding: advising relationship and, 200–201; chemistry research, 178–179; costs of proposed chemistry internships, 159–161; for English students, 352–353; ensuring for mathematics research, 127–128, 129; mathematic students’, 98–99, 121, 122; nature of U.S. research, 148; neuroscience, 241–242; scarcity of history, 292; time-to-degree and, 147, 163n7
- Future of Doctoral Study in English, The* (Lunsford and others), 378
- ### G
- Gedankenexperiment*, 424, 425
- Gender in chemistry programs, 182
- “General Education for Graduate Education,” 89
- German Ph.D. programs: *habilitation* concept, 151–152, 163nn9, 10; overview, 148
- Globalization’s influence on knowledge, 84–85
- Government: chemistry graduates employed by, 143, 160; educational methodologies influenced by, 259–260
- “Graduate and Postdoctoral Mathematics Education” (Ewing), 117n2
- Graduation. *See* Time-to-degree
- Grant writing, 157, 159, 231–232
- Granting of tenure, 44
- Great War, The*, 365

H

Habilitation concept, 151–152, 163nn9, 10

Handbook of Educational Psychology, The (Berliner and Calfee), 287

Higher Superstition (Gross and Levitt), 94n18

Historians: creating guild of, 334–338; cultivating next generation of, 304–305; educating, 305–307; shared values of, 329–334; time-to-degree, 292, 343

History: career paths in, 299–300; controversy in, 325–326; curiosity and interpretation in research, 311–312; curriculum for, 292, 303–304, 320–325; dealing with memory and facts, 317–318, 332; departmental structure, 338; epistemology of, 297; historical research into context, 330, 331; maintaining flexibility of intellectual heritage, 298; mentoring and apprenticeships in, 346–348; merging of disciplines with, 327–329; as narrative, 88, 295–296, 333; nature of historical knowledge, 296–297; objectivity in, 332–333; overview of, 291–294; public interest in discipline, 296, 299, 319; qualities of steward in, 307–309; relationships among students, 348; resistance to revisionism in, 318; rethinking courses, curriculum, and practices, 303–304; scholarship in, 300–303, 313–316; securing restitution for past wrongs, 315, 316–317; stewardship undermined in, 302–303; teaching art of synthesis, 306; time-to-degree for, 343; training professional generalists, 338–340; truth-fixing in, 299; viewing discipline as means for research, 298; writing dissertation, 292–293, 324–325, 340–343. *See also* Narrative

History of the Inductive Sciences from the Earliest to the Present Time (Whewell), 71

Humanities: antagonism felt toward sciences by, 85–86; collaborative practices in, 410; cultural analysis as work of, 403; culture wars within, 396–397; disorder of, 67; economic uncertainty of, 393–394; finding commonality with sciences, 86–88; messiness of, 391–400; old and new traditions within, 411–412; questions for programs in, 407–412; realigning, 409–410; reduced program size of, 394–395; responsibility and stewardship in, 404–407; rigor of studies in, 92n7; student goals after graduation, 410–411; tenure in, 405; unity within, 400–403; value of, 412. *See also* Education (as discipline); English; History

I

In Defense of Reason (Winters), 388n1

Incentive systems: encouraging reform with, 28–29, 47, 58; interdisciplinary research and, 30, 33n; reward system in chemistry programs, 202–204

Independent thinking: developing creativity and, 195–196; educating students in, 297; nurturing, 51, 74, 131; unemphasized for chemistry students, 137. *See also* Critical thinking

Interdisciplinary studies: bioengineering, 222–223; challenges in neuroscience, 221–224, 227–230; in chemistry, 177–178; education and, 253, 256; exploring beyond specialization, 77–79; grant writing for, 231–232; incentive systems for, 30, 33n; neuroscience, 212, 218–

221, 222–223; research challenges for, 29–31. *See also* Neuroscience
 Internships: creating chemistry, 159–161; educational psychology practicums, 280–281; mathematical, 116
 “Is the Scientific Paper a Fraud?” (Medawar), 81, 93n13

J

Japanese Ph.D. programs, 60
 Journalism as history, 328–329
 “Jumping Into the Culture Wars” (Adams), 388

K

Knowledge: confronting issues about, 65–66, 67; defining disciplinary, 68, 424; developing breadth of in chemistry, 174–178, 196–199; elements of study in education, 260–266; foundational mathematics, 107–108; generation of new, 10; globalization’s influence on, 84–85; growth of usable mathematical, 118n4; neuroscience’s body of, 213–215, 235–239; presenting theories of discipline, 277–279; social context and growth of, 69–70; stewardship and mathematical, 114–115; transformation of, 11–12; types of, 255–258

L

La Pietra Report, The (Organization of American Historians), 309n3, 4, 5
 Laboratory work: challenges for neuroscience, 242–243; lab rotations in neuroscience, 215–216; students joining lab of chemists, 136–137
Labyrinths (Borges), 385

“Languages of Criticism and the Sciences of Man, The”, 395
 Leaders: developing, 190–191; discipline’s reform by, 23–25; responsibilities beyond classroom, 27–28
 Leadership: doctoral programs developing, 190–191; providing faculty with skills in, 156–157; required in chemistry, 189–190
 Learning: critical thinking, 344; in education discipline, 260–266; emphasizing context of, 271–273, 279–281; finding time for student, 90–91; functioning of universities, 155–156; history of chemistry, 154, 158; how to teach, 375; networking, 51–52, 166; to prepare and publish research, 114, 115; research crucial to, 261–264; social models in, 278

Liberal Tradition in America, The (Hartz), 312

Life in School, A (Tompkins), 372

Life sciences. *See* Sciences

“Literary and Cultural Studies in the Transnational University” (Miller), 398

M

Making the Humanities Count (Solow), 413n11

Management and personnel skills, 155, 159

“Master”/“apprentice” concept, 305

Mathematics: declining numbers of students, 123–125; design of doctoral programs for, 115–116; development of discipline, 104–107; ensuring societal support of, 127–128; goals and context for education in, 121–123; growth of usable knowledge, 118n4; improving doctoral education in, 128–132; influence on other doctoral programs,

- 102–104; internships in, 116; involvement in K-12 curricula, 125; methodology of, 105–106; overview of doctoral education in, 97–100; preparation for research and teaching, 107–110; as profession, 102, 103, 107–112, 113, 116–117; professional identity of doctorates of, 110–111; promoting career paths in, 124–125; “pure” vs. “applied,” 132; responsibilities of mathematical Ph.D., 111–112; signs of success in doctoral programs, 120; statistics on earned Ph.D.’s in, 98, 117n3; stewardship of, 113–115; working in frontiers of science, 126–127
- Mathematics and Science* (Wright and Chorin), 127
- Mentoring: apprenticeships in history doctorate, 346–348; competition between faculty and students, 39–40; mathematics doctoral students, 130–131; rethinking ways of, 38–39; students through dissertation writing, 325; thesis directors and, 181
- Methodologies: improving courses in educational psychology, 273–277; mathematical, 105–106; politicization of education, 259–260; scientific method, 71, 86
- Microcosmographia Academica* (Cornford), 35
- Minorities: addressing multicultural issues in education, 286–287; awards received by, 203; cultural context of, 279–281; difficulties with composition courses, 377; in field of education, 246; hiring and promotion of, 203–204; influence on doctoral programs, 56; numbers of history Ph.D.’s among, 300; participation in graduate chemistry programs, 192; patronizing attitudes toward, 359, 360–362; recruiting by minority faculty, 156; social histories of, 313–314; underrepresented, 5
- Monographs, 340, 341
- Motivation, 280
- Multicultural issues in education, 275–276, 286–287
- Multidisciplinary studies: benefits of, 8–9; defined, 231; maintaining quality in, 229–230. *See also* Interdisciplinary studies
- “Myths of Transformation” (Stimpson), 414n13
- ## N
- Name of the Rose, The* (Eco), 385
- Narrative: history as making of, 333; precedents for making, 295–296; study of, 88. *See also* History
- Natural sciences. *See* Sciences
- Nature of Mathematical Knowledge, The* (Kitcher), 118n4
- Networking, 51–52, 166
- Neuroeconomics, 224
- Neuroscience: areas of specialization, 215; challenges in, 221–224, 227–230, 240–243; current programs in, 213–217; emergence of field, 233–234; goals for doctoral programs in, 239–240; interdisciplinary nature of, 212, 218–221, 222–223; knowledge in, 213–215, 235–239; laboratory rotations in, 215–216, 242–243; overview of field, 207–210, 211–212, 226–227; postdoctoral positions in, 209; preliminary exams, 216–217; relationship to life sciences, 218–221; thesis work in, 218
- Nonacademic careers: academic employment vs., 25–26; chemistry

- professions in industry, 145; for English Ph.D.'s, 353; historical scholarship in public, 323–324; history monographs and, 341; job crisis for humanities, 392–393; mathematics students in, 99, 110; in neuroscience, 208–209, 221; options for English, 386–387; preparing for, 51–53, 66, 81. *See also* Career paths
- Nontraditional paths in chemistry, 187–188
- “North American Time” (Rich), 412n1
- O**
- “Objectivity and Historians” (Kloppen-berg), 309
- Objectivity in history, 332–333
- “Objectivity Is Not Neutral” (Haskell), 309n1
- Oedipal competition with students, 39–40
- “On Proof and Progress in Mathematics” (Thurston), 118n6
- Opportunities for the Mathematical Sciences* (Division of Mathematical Sciences), 127
- Oral and written communications, 182–183
- Organization of essays, 15–16
- Outside lecturers, 176–177
- P**
- PART acronym, 426
- Paternalism toward women, 357–359
- Patronizing minorities, 359, 360–362
- Pedagogy: offering scholarship of, 266; pedagogy circles for English students, 366–367
- “Ph.D. Degree and Mathematical Research, The” (Richardson), 117n2
- “Ph.D. Octopus, The” (James), 335, 336, 337, 338
- Phi Beta Kappa, 404
- Political and social influences on sci-ences, 68–69, 84–85
- “Politics, Intellect, and the American University” (Bender), 392
- Pollution, 169
- Postdoctoral employment: apprentice-ships, 48, 49, 50, 158; mathemati-cians with Ph.D.'s, 99; postdoctoral positions in neuroscience, 209; sta-tistics on, 93n14. *See also* Career paths
- Practicums in educational psychology, 280
- Preparing a Nation's Teachers* (Franklin and others), 385–386
- Principia* (Newton), 69
- Professing Literature* (Graff), 378, 388
- Profession*, 362
- Profession: changes in history, 299–300; chemistry professions in industry, 145; communicating to public, 80–81, 82; defined, 102, 283; edu-cation as, 153; educational psy- chology as, 282–285; mathematics as, 102, 103, 107–112, 113, 116–117; professional identity, 110–111, 230. *See also* Profes- sional skills
- Professional generalists, 338–340
- Professional identity, 110–111, 230
- Professional skills: developing in chemistry, 181–186; improving educational psychology technologi- cal skills, 285–286; management and personnel skills, 155, 159; offered in chemistry programs, 143–146; practical knowledge within education discipline, 257, 265–266; preparing history stu- dents with, 344–345. *See also* Communication skills; Training

“Programmatic Attempt at an Anthropology of Knowledge, A” (Elkana), 94n20

Public: communicating profession to, 80–81, 82, 299; interest in history, 296, 299, 319

Publications: communicating profession to public, 80–81, 82; fraudulent papers on research, 81, 93n13; history dissertations intended as, 292–293; neuroscience, 217; writing for, 266

“Pure” vs. “applied” sciences, 132

Q

Qualifying exams in mathematics, 98

R

Reading: foreign languages, 183–184; reading seminars, 342–344

Recruiting: expanding pool of applicants, 192–193, 194; minorities, 156

“Reenvisioning the Ph.D.,” 162

Refiguring the Ph.D. in English Studies (North), 378

Reforms: faculty’s resistance to change, 34–35, 37; incentive systems encouraging, 28–29, 47, 58; responsibility for reform, 23–25; stewardship of disciplines and, 32

Regulatory and compliance issues, 157

Relativism in history discipline, 332

Relevance of doctoral programs, 47

“Religion as a Cultural System” (Geertz), 88

Renewing U.S. Mathematics (National Research Council; Board on Mathematical Sciences), 121

Report of the AMS, ASA, MAA, and SIAM workshop on Vertical Integration of Research and Education in the Mathematical Sciences (AMS), 118n7

Report of the Senior Assessment Panel of the International Assessment of the U.S. Mathematical Sciences (Odom), 121

Research: assigned topics for student, 89–90; chemistry, 149–150, 177–179, 188–189; collaborative English projects, 365, 366; as crucial element of inquiry and learning, 261–264; curiosity and interpretation in, 311–312; defining problems for, 76–77; developing in complex environments, 281–282; in education discipline, 247; educational psychology, 270; failures of educational, 272–273; focusing students on advances in, 180; fraudulent papers on, 81, 93n13; helping students develop approaches to, 131; history, 313–316, 339, 340; learning how to prepare and publish, 114, 115; linking graduate study with undergraduate, 383–385; mathematical dissertations, 98; nature of funding in U.S., 148; preparing mathematics students for, 108; proposals in chemistry, 179–180; quality of multidisciplinary, 229–230; standards for rigorous, 75–76; stimulating creative, 179, 195–196; teaching vs., 149–150; time taken from, 129; time-to-degree and scope of, 147, 148; turmoil in education, 259–260; unable to replicate educational psychology, 282

Research assistants, 137

Research groups: management and personnel skills needed for, 155, 159; mathematics, 131–132

Reshaping the Graduate Education of Scientists and Engineers (COSEPUP), 117n2

Restitution for past wrongs, 315, 316–317

- Retaining creative students, 187, 193, 199–200
- Rethinking American History in a Global Age* (Bender and others), 309n3
- “Rethinking—Not Unthinking—the Enlightenment” (Elkana), 94n20
- Revisionism in history, 318
- Rewards. *See* Incentive systems
- Rigor in social studies, 92n7
- S**
- S/Z (Barthes), 385
- Scholarship. *See* Research
- Sciences, 65–96; antagonism felt toward, 85–86; arguing in favor of symmetry rules and beauty, 87–88; biological sciences, 92n2; communicating discipline to public, 80–81, 82; confronting epistemological issues, 65–66, 67; defining research problems in, 76–77; developing depth and breadth of training in, 79–80, 174–178, 196–199; embracing risk and rigor in, 73–76; finding commonality with humanities, 86–88; incomplete paradigms and theories in, 71–72; innovative changes proposed, 89–91; mathematics in frontiers of, 126–127; neuroscience and relationship to life, 218–221; political and social influences on, 68–69, 84–85; “pure” vs. “applied,” 132; required courses on scientific method, 86; scientific method, 71, 86; special challenges in graduate education for, 65–66; stewardship in, 72–73
- Scientific Knowledge* (Barnes and others), 92
- Scientific method: controversy over unified, 71; required courses on, 86
- Seminars: introductory doctoral, 78–79; suggestions for history reading, 342–344
- Sensitivity training, 156
- Shortening doctoral programs, 59
- “Should Doctoral Education Change?” (Jackson), 117n2
- Skills. *See* Communication skills; Professional skills
- Social models in learning, 278
- Social sciences. *See* Humanities
- Social Studies of Science* (Stolzenberg), 94n18
- Social Theory and Social Structure* (Merton), 92n1
- Sociocultural influences on education, 271–273
- “Socio-Economic Roots of Newton’s *Principia*, The” (Hessen), 92
- Sokal Affair, 69, 94n18, 397
- “Sokal Affair and the History of Criticism, The” (Guillory), 394, 401
- Sokal Hoax* (Labinger and Collins), 94
- Specialization: avoiding in sciences, 66; community of research in areas of, 113; in educational psychology, 287–288; exploring disciplines beyond, 77–79; neuroscience and areas of, 215
- Starting *de novo*: building education model for, 423–426; designing doctoral program by discipline, 424; history timeline for, 320–325; questioning disciplines and departments, 421; student-centered doctoral programs, 204, 424–426, 427, 428
- Statistics: comparison of doctorates by discipline, 394; doctoral employment, 93n14; earned mathematic Ph.D.’s, 98, 117n3; history Ph.D.’s among minorities and women, 300; number of faculty and students in English departments, 351–352; Ph.D. chemists, 135–136; using in educational psychology, 274
- Steward of disciplines: communicating discipline to public, 80–81, 82; defined, 5, 12–13; developing,

- 13–14, 72–88; emphasizing student needs in discipline, 46–48; humanities, 404–407; in neuroscience, 224–225; nurturing next generation of historians, 304–305; principles of, 12–13; qualities of steward in history, 307–309; reform and, 32; responsibilities of, 74–75, 111–112; roles and skills of steward, 9–12, 13; for sciences, 66; stewardship of mathematics, 113–115; studying biographies of past, 80; undermining, 302–303; understanding diversity of careers in discipline, 58–59
- Strengthening the Linkages Between the Sciences and the Mathematical Sciences* (National Research Council), 133–4n
- Structure of Scientific Revolutions* (Kuhn), 69
- Student-centered doctoral programs, 204, 424–426, 427, 428
- Students: arguing in favor of symmetry rules and beauty, 87–88; assigned research topics, 89–90; attrition of, 5, 187, 193; beliefs and misconceptions about education, 258, 266; challenges for science, 65–66; communication skills for, 52–53; competition with mentors, 39–40; confusion among English doctoral, 371–372, 374–375; cultivating depth and breadth in training, 79–80, 174–178, 196–199; declining numbers of mathematics, 123–125; developing critical thinking, 73–76, 87; dissertation-writing groups for, 325; economic demands on, 42; educating in independent thinking, 297; elements of study in education discipline, 260–266; emphasizing needs in doctoral programs, 46–48; empowering chemistry, 193–194; evaluation of faculty, 42–43; exploring disciplines beyond specialization, 77–79, 154–155; finding time for learning, 90–91; first year of *de novo* history timeline, 320–323; focusing on research advances, 180; following careers of, 54–55; funding for mathematics, 98–99, 121, 122; importance of becoming team player, 53; increasing numbers of talented, 56–57; involving in departmental change, 40–41; joining faculty chemist's lab, 136–137; learning about K-12 cultural context, 279–281; limited academic employment opportunities, 25–26, 47, 48–51; mentoring, 38–40, 131; networking, 51–52, 166; number of in English departments, 351–352; nurturing as next generation of historians, 304–305; nurturing independent research and thought of, 51, 74, 131; overview of chemistry programs for, 136–137; paternalism toward women, 357–360; preparing for faculty career, 150–151; profiles of chemistry, 191–193; promoting careers in mathematics, 124–125, 130; questions about graduate school experience, 422; relationship with adviser, 200–201; research in education discipline, 247; retaining creative, 187, 193, 199–200; second year of *de novo* history timeline, 323–324; soliciting input on doctoral programs, 55; teaching art of synthesis, 306; teaching preparation for, 81–82; value of relationships among, 348
- Studying past stewards, 80
- Substances: detecting dangerous, 168; learning to manufacture new, 167;

research on, 172; transformation of, 172–173
 Synthesis, 306

T

Teaching: apprenticeships in, 153–154; breadth and depth of discipline, 196–199; commitment in English departments to, 370–371, 376–377; creative writing, 385; deficiencies in preparation for, 26; developing mathematician's skills for, 115; education as profession, 153; emphasizing learning in context, 271–273; intensive course on, 158; learning by doing, 375; preparing students for, 81–82, 108–109, 130, 265–266; relation between doctorate and good, 336–337; requiring courses and workshops on, 382; research vs., 149–150; skills needed for chemistry, 184–185; training required in, 345; undergraduate writing courses, 376–377. *See also* Education (as discipline); Teaching assistants

Teaching assistants (T.A.'s): chemistry, 137, 184–185; English students as, 352–353, 367, 375–376; history students as, 324, 345–346; mathematics graduate students as, 98–99, 121, 129, 130

Team players, 53

Tenure: explaining issues to new faculty, 156; faculty conservatism and, 36–37; granting of, 44; involving untenured faculty in change, 43–44; standards for, 405

That Nobel Dream (Novick), 309

Theories of Learning (Hilgard), 277

Theses: chemistry, 180–181, 199–200; importance of, 53; neuroscience, 218; replicating findings of educa-

tional psychology, 283. *See also* Dissertations

“Thick Description” (Geertz), 88, 403

Thinking. *See* Critical thinking; Independent thinking

“Time for Change?, A” (Chan), 99

Time-to-degree: averages for, 146; for chemists, 136, 145–150; history doctorates, 292, 343; shortening, 129, 149

Towards Excellence (Ewing), 121

Training: ethics, 144, 145, 159; ideals of in chemistry, 142–143; mismatch between career tasks and, 26, 27, 151; professional generalists, 338–340; required for teaching, 345; sensitivity, 156; in technology, 285–286. *See also* Professional skills

Transformation of knowledge, 11–12

Travels and Adventures of Serendipity,

The (Merton and Barber), 93n13

“2001 Annual Survey of the Mathematical Sciences, Second Report,” 125

U

Undergraduate education: linking English graduate study with, 383–385; questions with “right” answers, 196; writing courses, 376–377

Unity within humanities, 400–403

Universities, learning functioning of, 155–156

University in Ruins, The (Readings), 398

Untenured faculty, 43–44

Uses of the University, The (Kerr), 37

V

Variational Principles of Mechanics, The (Lanczos), 72

W

What is English? (Elbow), 378

Women: awards received by, 203;
decreases in history Ph.D.'s, 300; in
field of education, 245–246; hiring
and promotion of, 203–204; num-
ber in advanced degree programs,
5, 352, 358; participation in gradu-
ate chemistry programs, 192, 202–
203; paternalism toward, 357–360;
social histories of, 313–314

Writing: commitment in English

departments to, 370–371,
376–377, 383; communicating pro-
fession to public, 80–81, 82; cre-
ative, 385; English dissertation,
352, 368–369n3; fraudulent papers
on research, 81, 93n13; grants, 157,
159, 231–232; history dissertation,
292–293, 324–325, 340–343; neu-
roscience publications, 217; publi-
cations in education discipline, 266;
teaching undergraduates, 376–377.
See also Dissertations; Theses