of commercial competition were often not compatible with the customary free and critical exchange of ideas crucial to academic science. It was with some relief, then, that Braun acceded to the merger of all German radio concerns in 1903, including his own, to form one of the giants of the world radio industry, Telefunken.

As deeply involved as he might be in scientific or technical matters, Braun maintained a careful equilibrium in his own life-style. He was notable as a teacher and a popularizer of science and was widely liked. It is particularly poignant, therefore, to read of the collapse of his life and career in the turmoil of the First World War. Not only did Strasbourg's proximity to the Front thoroughly disrupt university life, strategic concerns caused Braun to be sent in late 1914 to the United States to defend German radio interests. The war prevented his return home, and he died in April 1918, at age 67, in Brooklyn, New York.

The lonely circumstances of Braun's death brings us back to the question posed by the diminution of his reputation over the years. In a particularly thoughtful epilogue, the authors ponder the sources of scientific fame. Braun's death far from home brought little of the recognition that normally attends the passing of great scientists. The demise of the German university at Strasbourg left no institution to perpetuate his name. And the simple lack of a biographer for a half-century after his death left Braun without a champion in the lists of scholarship or journalism. This last problem, at least, now has been successfully remedied.

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Intelligence and Some of Its Testers

The Mismeasure of Man. STEPHEN JAY GOULD. Norton, New York, 1981. 352 pp., illus. $14.95.

Commenting on the controversy over IQ tests, especially on the exchange of barbs between Walter Lippmann and Lewis Terman in the *New Republic*, Terman's publisher wrote him in late 1922 that the publicity was probably good for the business. Publishers still seem to think so. Since its revival in 1969, the "IQ controversy" has given rise to a steady stream of books, if not an industry. Most of these books have been authored by outsiders to psychometrics, like Herrnstein, Kamin, Eysenck, even Jensen before the '60's. Outsiders have been important; their attacks on the testers' hereditarianism started the first row. In the recent battle, Kamin and the British journalist Oliver Gillie played a crucial part by forcing into the open the Burt affair, which left hereditarians in disarray. Often, however, old arguments have outnumbered new ideas in such books.

Nonetheless, several new volumes have appeared recently, one of them *The Mismeasure of Man* by Stephen Jay Gould, Harvard paleobiologist and well-known author of several books on evolution. Aimed at demolishing biological determinism as a "theory of limits," it tells the story of craniometry in the 19th century and, at greater length, of intelligence testing in the 20th.

Gould's story contains some intriguing details: a fascinating Agassiz letter describing the emotions aroused by his first encounter with blacks; S. G. Morton "finagling" with his skull measurements; H. H. Goddard tampering with photographs of the "feebleminded" Kallikaks; Catherine Cox throwing out some ratings of the IQ's of the eminent dead; Gould's Harvard class taking the old Army Beta test; and so on. Behind such specifics Gould discovers the twin fallacies of "reification" of intelligence and scientistic obsession with (numerical) rankings. The book ends with a declaration of faith in human flexibility and potentiality, in the face of pessimistic, politically oppressive doctrines of determinism. Clearly, Gould is on the side of the angels; several positive reviews have appeared to prove it. In fact, the book has won a National Book Critics Circle Award.

But if the book is taken seriously as history of science, not just as another popular exposé of scientific racism, a careful reading brings some problems to light, problems on three levels: of the historical account, of the conceptual analysis, and of the wider context.

The historical account covers fairly well traversed ground. Lombroso (who does not seem to belong in this book on intelligence) and the Kallikaks have been used for decades by psychology texts as boogiemen of "bad science." C. C. Brigham's *Study of American Intelligence* (1923) has been a handy source for quotes illustrating misguided or virulent scientism-racism at least since John Higham's *Strangers in the Land* (1955). Gould's history of the IQ parallels Kamin's: the open-minded Binet, distorted by the hereditarian dogmatists Goddard and Terman; Yerkes, Brigham, and the Army intelligence tests; their impact on immigration restriction.

In fact, though, Brigham's book was taken to task soon after publication in at least three reviews by psychologists, among them E. G. Boring writing in the *New Republic*. To say, as Gould does, that the Army tests "led to the Immigration Restriction Act of 1924" (p. 157) unfortunately repeats the gross overestimation some authors have made of the influence of the testers' efforts. It is based on no more evidence than a post hoc, propter hoc, supplemented by a (self-serving) quote or two from the hard-line eugenicists around Madison Grant and C. B. Davenport. But neither Yerkes nor Brigham nor any other psychologist ever testified before Congress—though some biologists did. The three reports of the House Committee on Immigration did not mention intelligence tests once. And though the congressional debate did include occasional references to the test data, they played no major role in it. Other arguments and "data" were loose in the land.

Gould's brief discussion of the other "major political triumph" of the testers also overstates their impact. Britain's notorious "11+ examination" was not a creation of the psychometricians led by Cyril Burt; it developed slowly out of the "free place examination" for grammar school scholarships, instituted before any IQ tests existed. The testers' growing influence produced the eventual inclusion of an IQ test in and a new rationale for 11+, but not the examination itself or its social functions.

Most of this has been said before. But Gould has also done some homework (though unfortunately not in archival sources) and has dug up additional and interesting material. He noticed the crudely retouched faces in Goddard's book on the Kallikaks—although one wishes for some evidence showing that this was indeed Goddard's doing; after all, publishers have been known to make "improvements" on their own. He rediscovered Cox's tour de force of attempting to match IQ's to the recorded, and clearly incomplete, biographical "data" on the childhood of eminent historical figures. I am a bit baffled by Gould's sarcasm about the basic idea, though. I would have thought that paleobiologists might have more sympathy with guesses based on fragmentary data. And Cox's summary of her conclusions (not mentioned by Gould) turns out to be more bland, or, rather, catholic, than Gould

would lead one to expect. She attributed to the eminent not only "above average" heredity but also "superior advantages in early environment," persistence, confidence, and strength of character (C. Cox, *The Early Mental Traits of Three Hundred Geniuses*, 1926, pp. 215–218. Readers should also check, on pp. 68 and 72, Cox's figures and explanation of the reasons for eliminating two raters against Gould's account of them).

Giving the Army Beta to his undergraduate class, Gould discovered some of the absurdities of the procedure that had plagued the Army testers. The grades his class received, incidentally, were above the distribution for World War I officers, in spite of the datedness of some of the test items. Altogether, Gould's treatment of Cox's work, of the Army tests, and of some other specifics may be a bit more polemical and whiggish in tone than it needs to be, and not always quite accurate. But more space than is available here would be needed to spell out such judgments.

Beneath this history of "mismeasures" lies, Gould thinks, the fallacy of "reification," of turning "intelligence" into a single measurable thing. But this diagnosis remains blurred, since Gould's emphasis seems to shift about. Exactly what does he object to: A single "general intelligence" (g), instead of multiple abilities? Measuring the unmeasurable? The "thingness" of g, as contrasted to nonmateriality, process, or what? But no tester, however obsessed with the importance of IQ, ever thought of it as literally an independent "thing in the head." The hypotheses linking intelligence to brain processes, energy, and the like may have been wrong and naïve, and "reductionist" to boot. But, though Goddard was clearly naïve (and wrong) in linking feeblemindedness to a single gene, to accuse him of a logical fallacy seems less like wisdom than like being wise after the event. As for reductionism, some link between intelligence, however defined, and brain processes would be assumed by most biologists I know (which does not make it true).

Come to think of it, Gould never tells us directly what his own proper, unreified conception of intelligence is. He does use "mentality" (p. 24), even has "no doubt . . . that IQ is to some extent 'heritable' " (p. 155). He also says: "Causal reasons lie behind the positive correlations of most mental tests" (p. 251), and believes that "a factual reality exists . . ." (p. 22). All that does not solve my problems with his "thingness;" it also makes me wonder if Gould's problem is to have reified the testers' metaphors. As for measurability, testers have indeed often taken their numbers too seriously. But Gould does not seem to reject all testing.

There remains the question of "singleness." After a clear exposition of the basics of factor analysis, Gould points out that it does not provide a unique solution; hence it cannot decide between theories of a single intelligence (g) and of multiple abilities. But that may not be too helpful either, as extramathematical considerations, including usefulness, now become relevant. The National Merit exam measures two separate abilities—then adds them together to award scholarships, without worrying much about a reified g. Reification may be a bad thing indeed. But Gould's diagnosis seems too formalistic; I think it misstates the issue.

Of course, there is another definition of reification, as abstracting a part of the concrete, interconnected world, isolating it from its context, and turning it into an "object," a commodity. This alternative seems to come closer to the point. It also links reification to the other root fallacy identified by Gould: "ranking," on a single dimension in terms of worth. Now ranking remains no longer the strange obsession of individuals, presented by Gould in thumbnail sketches without much explanation why and how they became so involved. Instead, it puts the whole problematic back into its social-historical context. Not just individual hangups but technological and political decisions of all kinds demand a (unidimensional) ranking of multifaceted realities, together with a legitimation of the ordering used.

A few days after reading Gould's book, I received my October (1981) number of the *American Psychologist*, a special issue on testing, with some 20 articles by experts (and one "outsider"). Reading this issue was like stepping into a world different from Gould's. A lead article proclaims a well-grounded science of human abilities to be alive and well, another comments on the recent growth of testing, and on p. 1129 we are informed of the ultimate reification, in the second sense: that a computer programmer rated at the 85th percentile on job performance is worth $20,800 per year more to the employer than one at the 15th percentile and that cognitive ability (read: intelligence) tests will select the better programmer.

In short, ability testing is out there, a sizable industry in the "real world," and a smaller one in academia. And all Gould's incisive thrusts at "finagling" and "fallacies" seem to be almost irrelevant to it; Burt's name appears only once in the 20 reference lists in the *American Psychologist*. Let me not be misunderstood. None of these experts are "racists." (Almost all of them step gingerly around the issues of heritability and race differences.) There is much concern with legal issues, affirmative action, special education, and the social responsibility of testing—together with complaints about the bad, and largely unfair or at least exaggerated, press testing has received. In all, there is hardly any direct contact between Gould's arguments and the issues occupying the experts. I am not sure just what to make of this contrast; and this is not the place to speculate. It does seem to mean, though, that whatever intellectual victories over the (mostly dead) testers Gould's eminently readable book achieves, its categories may not be particularly helpful in dealing with present realities; the real action seems to be elsewhere.

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The Beetles

The Biology of the Coleoptera. R. A. CROWSON. Academic Press, New York, 1981. xii, 802 pp., illus. $139.50.

It is often said upon the retirement of a taxonomist that he or she should write a general natural history of his or her particular group, so that years of unpublished observations and speculations will not be lost. R. A. Crowson, the world's leading authority on Coleoptera, has far exceeded this expectation by producing a modern reference work covering virtually every aspect of biology that in any way relates to beetles. The magnitude of the task completed may be appreciated when one considers that the order Coleoptera includes more described species than there are vascular plants and has an evolutionary history dating from the Permian. Crowson's exhaustive treatment of beetle biology is based not only on his own experience but on an up-to-date survey of the literature (the bibliography contains almost 1200 entries, of which 40 percent are later than 1970).

The three chapters on the morphology of adults and immatures will be particularly useful to those concerned with problems of beetle classification, because many commonly used terms have not been properly defined or illustrated previously. The next several chapters