

Natural Science, Superstition, & Academic Institutions ***Part II (of II)***

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[This is part 2 of another topical excerpt from “Person, Life, and Culture,” a later chapter of the author’s book, *General Behaviorology: The Natural Science of Human Behavior* (Fraley, 2008). Given its relevance to improvements in cultural concerns, readers of this journal may find it pertinent. The first part was presented in the Fall 2008 issue (Volume 11, Number 2).—Ed.]

Today, few people yearn for a return to what are regarded as the “dark ages” of premedicine or to the preindustrial era when people had to toil in drudgery merely to survive—their lives typically short and many hardly worth living as judged by modern standards. We owe our rescue from that plight to the implications of our cultural investment in physics, chemistry, and biology—basic disciplines that have informed the work in the various applied fields that have provided improvements to the human condition.

Superstition and Natural Science with Respect to Cultural Development

Current reviews of life in earlier times often feature a romantic focus on the small fraction of individuals who in one way or another exploited the economic and social predicament of others to attain even a meager approximation of the life enjoyed by most people in contemporary culture. A small class of exalted individuals kept the majority’s minimal subsistence contingent on its collective support of a relatively more comfortable life style for those privileged few. However, by present standards, such privileged individuals tended not only to be ignorant, dirty, and stinky, but typically died relatively young, often after suffering horrendous trauma or disease from which they could be rescued neither by the labors of their underlings, the sympathetic efforts of their exalted peers, the ministrations of contemporary healers, nor superstitious appeals to what they assumed to be their supernatural overseers.

However, that dark age continues with respect to human behavior, a domain of phenomena that most people still approach with arbitrary practices informed by superstition. The adverse implications of such practices

abound and seem to worsen as the human population expands and technology shrinks the planet. Yet those superstitious practices are defended and promoted by the many who in various ways have invested heavily in them. Such advocacy is especially vigorous by those whose personal economic and social well being depends on the implications of widespread recourse to the particular themes of superstition that they promote.

We celebrate the cultural advances of our times in part by reviewing how people eventually overcame resistance to advances in human well being that were being mounted by the forces of organized ignorance and superstition. We retrospectively deplore the resistance that impeded the cultural progress that was becoming possible through applied physics, chemistry, and biology—resistance that was sometimes deliberate and sometimes inadvertent. Today it is fashionable to lament the tragedy of the multitudes that could have lived better and longer lives had the forces of organized ignorance and superstition been overcome sooner.

Yet even now, a vast superstitious majority continues to proselytize and to teach that the implications of its popular superstitious analyses of human behavior constitute the righteous fate of mankind. In cases where those implications are aversive or seemingly illogical, they are nevertheless to be accepted and endured faithfully. As always, the quality of life may be diminished in various ways for those who are affected insofar as they may experience (a) contact with fewer kinds of positive reinforcers (life is less broadly enriched), (b) a lower density of contacts with positive reinforcers of whatever limited kinds remain allowed (life is less joyful), and (c) prolonged contact with aversive stimuli (life can be harsh). If such a degradation in the quality of life pertains not to one’s own life but to another person’s life, the prevalent conditioning generally tends to prepare one to disregard rational tendencies toward compassion and to hew instead to whatever current interpretations of the superstitious ideology may be resulting in that person’s plight.

Typically, those who have organized effectively to promote the more popular forms of behavior-related superstition have conditioned their followers to experience reinforcing emotional reactions when behaving accordingly. That is, people have been conditioned to feel good when they exhibit those kinds of superstitiously informed behavior. In accordance with the accompanying instruction, the affected people then tend to misinterpret those good feelings as an indication that whatever superstitious behavior elicits those positive emotional reactions is intrinsically meritorious.

However, any person can be conditioned to experience any specified kind of emotional reaction to any given kind of event, so people can be conditioned to feel just as warm and fulfilled upon behaving objectively as

most now feel upon behaving superstitiously. The emotional conditioning that now supports indulgence in currently popular cultural superstition could have been made to pertain instead to behavioral repertoires that would comport with a philosophy of naturalism. General ignorance about the respondent and operant aspects of emotional behavior has presented the purveyors of cultural superstition with a substantial promotional opportunity that they have tended to exploit extensively if only intuitively.

In most cases, people who exhibit an extensive superstitious repertoire have amassed a substantial personal investment in the implications of their superstitious assumptions and by now cannot afford the implications of a substantial overhaul of their behavior. Typically, they will also be burdened with the ignorance that is left in the wake of the inferior kind of education that superstitious assumptions typically misguide, which diminishes their capacity to profit from belated corrective measures. However, a strategy for cultural change that includes circumventing and ignoring superstitious people is feasible only if the behavior of strongly superstitious people can be tolerated through the remaining course of their lifetimes—behavior that may include aggressive countermeasures to prevent the expansion of objectivity within the general culture.

It is probably easier to create a predominantly superstition-free culture by attrition than by conversion. Change that is based on attrition requires carefully avoiding the superstitious indoctrination of new persons while foregoing costly and often unproductive efforts to change the strongly conditioned superstitious behavior of people who have had a long involvement with it. But keeping new people free of superstitious indoctrination is difficult when they are being raised by superstitious parents.

However, that feat has long been approximated, at least to a limited degree, by requiring such children to undergo a public education during which they are brought under control of both scientific methods and objectively produced outcomes. This alludes to the fact that even in schools that serve a generally superstitious culture and which deliberately teach respect for various kinds of superstition, the natural science community is usually represented on a limited beachhead where the objectivity that naturalism fosters can be demonstrated to yield more efficacious results than does recourse to superstition. In some cases those presentations affect students in whom the indoctrination in superstition has as yet been superficial. Further substantial progress could be made if the general lesson about scientific efficacy were to pertain to behavioral phenomena to the same extent that it pertains to other classes of phenomena. In any case, one result of the natural science foothold within the schools has been that children, upon becoming adults,

have tended to exhibit less behavior that is controlled in blatantly superstitious ways than did their parents.

Note, too, that the same cultural development strategy that is available to those who promote naturalism is also available to superstitious communities as a method of countercontrol. Within communities and cultural institutions that promote superstitious practices as a worthwhile way of coming to know, young people are typically shielded from opportunities for alternative conditioning while being indoctrinated in the prevailing superstitious philosophy. Such shielding may be accomplished in the schools by formally requiring presentations of science that are balanced between natural and superstitious interpretations, or in more extreme cases by hiring people to teach science who interpret natural phenomena according to the prevailing superstitious assumptions. In addition, just as the natural science community may sponsor private schools to preclude students' being indoctrinated with superstition, a superstitious community may establish private schools to eliminate all vestiges of naturalism, and currently the latter far outnumber the former.

On a broader scale, in political democracies, which extend to each individual the right to vote, a superstitious majority can easily gain control of the government and then use the government's broad spectrum of ways and means to protect and promote its superstitious ideology. Through the agency of government, the requirement of public displays of conformance to superstitious ideology can be appended to formally prescribed, and in some cases required, exhibits of citizenship.¹

In the various contests for intellectual predominance that characterize contemporary human culture, the natural science community, absent an organized natural science of behavior among its rank and file, is largely unprepared to muster and apply the most relevant of its potential disciplinary resources—namely, a natural science of human behavior. A natural science community is not only rendered more complete by the addition of behaviorology to its core of basic disciplines, it thereby equips itself with the precise science not only by which to analyze superstitious behavior per se but to replace it. As this book has made clear, a natural science of attitudes, values, rights, ethics, morals, and beliefs is not merely possible, its fundamentals have already been developed.

¹ A familiar example in the United States of America is the Pledge of Allegiance, which includes a statement that the nation exists under the oversight of God. That inclusion was inserted by a government that acted in behalf of a religious majority, and most school children are routinely compelled to recite it daily after the legitimacy of that coercive practice was upheld by a judiciary consisting of Presidential appointees who were subsequently approved for service by a congressional majority.

[In the author's book (Fraley, in press), the chapter from which this article is excerpted comes a couple of chapters after the chapter titled "Attitudes, Values, Rights, Ethics, Morals, and Beliefs."—Ed.]

The natural science community has served human culture well, but it is arguably time that it move beyond the creation of better tools to include the creation of better behavior. Behaviorology must become established as the fourth basic discipline in the natural science neighborhood if that community is to offer scientifically informed practices that can substitute for the superstition-based practices that continue to be promoted throughout contemporary culture. Of special importance in that regard are scientifically based practices for bringing other kinds and patterns of behavior under appropriate control.

Arguably, it is unlikely that any culture can endure indefinitely or at least prosper optimally while relying on superstitious interpretations to guide its sociocultural affairs. With a natural science of behavior-environment relations among its conceptual armamentarium, the natural science community would be postured to replace the superstitiously co-opted social sciences with which it must now maintain an often uneasy cooperation. That troublesome alliance has its potential costs. The sociocultural implications of natural science products can be diminished, and in some cases the conduct of natural science per se can be corrupted.

Like the phenomena in the other aspects of our environment, nothing about sociocultural phenomena requires an indulgence in superstitious thinking either for accurate analyses and descriptions of function or for the attainment of their advantageous control. The quality of enduring mystery, no matter how awesome it may be made to seem, is more indicative of disciplinary inadequacy than connotative of nature perturbed by supernatural influences.

Historically, the natural science community has managed its vast impact on the culture from a posture of relative isolation in the sense of the somewhat independent organization of the natural science community within the culture. From the founding of Great Britain's Royal Society in the 1640s, the natural science community has continued to avoid the unpromising strategy of infiltrating superstitious communities in an attempt to dispel long and well established recourse to superstition among their members. Instead, the natural scientists have acted to maintain the epistemological integrity of their community through organizational independence that continues to feature some measure of isolation within the culture at large (e.g., separate academic departments for training new scientists, exclusive professional organizations, control of their own literature, et cetera).

Even though churchmen were prominent among the founders of the Royal Society, the issues of scientific in-

terest in those times often pertained to matters that could withstand an objective investigation without apparent challenge to organized religion. That is, the largely physical and biological phenomena on which the science of those times was focused seemed to differ in generic ways from the phenomena on which religion concentrated, so the prevailing science seldom tended to challenge the superstitious behavior with which churchmen approached those aspects of nature upon which they concentrated. Overlaps were handled through agreements that objective natural scientific activity was merely revealing the mechanisms of maintenance that were left in place following previous creative miracles performed by a deity—miracles of such antiquity that they remained as yet beyond the reach of objective recasting.

In modern times, increasingly, the problems that threaten human culture and require effective scientific solutions are of a behavioral nature. This at a time when the natural science community, for lack of a strong incorporated component focused on human behavior, remains largely unprepared to respond to such problems. Absent a well established natural science of human behavior, the natural science community must simply deposit such matters on the doorstep of the agencies of organized superstition for resolution, and the outcomes are of the kinds that superstition tends to inform.

At the same time, the natural science community has continued to make available to the culture at large its various conceptual and material products. These contributions have been of such great effectiveness that the people who are expected to solve practical problems within the culture have been rendered dependent upon the products of the natural science community. Those consumers of conceptual and material scientific products have developed a vested interest in the prosperity and scientific integrity of the natural science community from which those products emanate. As a result, the natural science community is now to some degree protected, in many cases with reluctant necessity, by the direct consumers and by at least some of the ultimate beneficiaries of its intellectual and material products. Most such protections inhere at the somewhat informal level of policy and tradition.

Strategically, that same course of well tested and successful historical progress by which the long established natural sciences have acquired and maintained some degree of integrity within the culture would seem also appropriate for the development and support of a newer natural science, the products of which pertain, not to energy, matter, or structures that live, but to behavioral phenomena. The communal insularity that permits natural science to develop within a superstitious ambient culture is achieved in two principal ways—first, through independent professional organizations whose members

establish and maintain the prevailing standards for disciplinary membership, and second, through the organizational isolation of the natural science programs within contemporary academic institutions. Universities typically feature departments of physics, chemistry, and biology that may be clustered together in a larger unit that has a scientific identity. Also included may be departments of applied science (e.g., geology, meteorology, oceanography, etc.) that have gained a reputation for practice in accordance with the tenets of natural science.

That kind of organizational insularity within academic institutions is essential to the epistemological integrity of the natural science community. That organizational independence, especially within higher education, enables the epistemological integrity of naturalism to be maintained to a helpful and necessary extent. Absent the protective preservation of its underlying philosophy of scientific naturalism, which requires a measure of isolation from the heavily superstitious ambient culture, the natural sciences are much more vulnerable to the ravages of intruding superstition.²

The Status of Natural Science in Academic Institutions

Regardless of the importance of natural science to human culture, epistemological integrity is *not* the officially recognized criterion by which the isolation of the natural science units has been established within higher education institutions. The kind of insularity that characterizes a particular natural science department within a typical university is officially justified only on the basis of the kind of subject matter upon which its studies are focused. Any attempted official or institutional endorsement of epistemological purity would be subject to challenge as a contradiction of the Constitution of the United States of America and thus disallowed, at least in institutions that rely on government funding.

Theoretically, however, the neural behavior of thinking can be subjected to qualitative culling both according to the effectiveness of its implications and according to whether current evidence is interpreted according to objectively produced criteria. That is, thinking behavior can

² This insularity extends downward into secondary schools, although it is less well established there. At that level, the natural science curriculum tends to be clustered in courses, each typically taught by one teacher who became qualified through training in a natural science program at the higher education level. However, teachers whose interpretation of the subject matter in those courses is informed by superstitious philosophy may be appointed to teach those courses, a kind of corruption of natural science that is typically kept beyond the corrective reach of the organized natural science community.

be selected for social reinforcement (i.e., regarded as valuable) not only if it shares in the control of effective outcomes but also, more intrinsically, if the interpretation of evidence is according to criteria that have been established objectively as opposed to having emerged superstitiously. We are intuitively responding differentially to those qualitative nuances when we categorically distinguish between effective thought and logical or orderly thought (insofar as a thought can prove effective, perhaps accidentally, even though it is not logical).

Note, however, that even logical thought, when it is partly informed by superstitious assumptions and is therefore incorrect, may result in ineffective practical outcomes upon sharing in their control. As is often observed, logical, orderly, and perhaps complex thought that is predicated on invalid assumptions can lead to major mistakes.³ On the basis of a person's logical, orderly, and perhaps complex thought in general, that putatively agential person may be described as *smart*. But on the basis of the ineffective practical behavior that functionally follows a particular instance of such thought, that same person may be described as *wrong*. That discrepancy typically results when evidence is interpreted to comport with superstitious basic assumptions, no matter how logical that initially ill-informed subsequent interpretation may be.

The *interpretation* of evidence by a person alludes to the function of a largely verbal class of stimuli that shares, along with the environmental evidence (generally called the *subject matter*) in controlling that person's reactions to that subject matter (i.e., to what has been encountered in the environment). That supplementary class of verbal stimuli is said to be that person's *philosophy*. The intrinsic quality of its interpretive function is established by the nature of the origin of that philosophical class of verbal stimuli. Specifically, if its constituent assumptions have

³ For example, if one insists incorrectly, as an implication of superstitiously informed assumptions, that natural processes cannot produce ordered complexity beyond what is to be expected as an occasional accidental random outcome, then one may readily attribute natural complexity to a sufficiently powerful deity who is conceptually endowed with the necessary capacity for such creative feats and who must have been under contingencies to bother with such exercises. This may even characterize the thinking of persons who are popularly regarded as intellectual, scholarly, and learned. If they also happen to be in positions of educational leadership, they may then logically de-emphasize the natural sciences in the curricula of the schools and replace them with more extensive theological studies on the assumption that the complex wonders of nature can best be understood through a greater familiarity with the putative deity by whose creative exercise nature has manifested.

each emerged by induction from large numbers of relevant operant iterations (i.e., from the results of many trials) then the functioning by members of that class of assumptions (interpretations according to that philosophy) lends the quality of objectivity to the ongoing thinking.

However, the qualitative analysis of thought (as exemplified by the preceding paragraph) has not yet sufficiently emerged as a sufficiently common general concept within the culture to support the confident and consistent enforcement of quality controls based on the intrinsic epistemological quality of thought as reflected in its publicized descriptions. For example, although within contemporary culture there is some exertion of social control that maintains objective thinking rather directly, superstitious thinking is not necessarily subject to *prima facie* discount. Thought remains largely under indirect control by the acceptance or rejection of the outcomes that it shares in producing. That is, when some neural behaviors of the thinking kind are finally recognized on the basis of their outcomes to have represented a good or a bad idea, the original thinkers' public descriptions of their further thoughts will tend to be subject to a socially imposed differential reinforcement that favors the further ideas of those whose previous thoughts were proven to have shared in the control of effective outcomes (i.e., whose previous thoughts subsequently proved to have been good ideas).

Thus, within the culture at large there tends to be few if any formal protections for natural science based on the intrinsic qualities of its definitive neural behavior (i.e., the philosophical verbal behavior that shares in the control of one's reactions to the environmental phenomena that are under consideration—verbal stimuli that qualify—control those reactions such that they represent a natural science discipline). Credentialling programs operated internally by the natural science community may arguably represent a preliminary step in that direction insofar as a formal credentialling process tends to cull out individuals whose intellectual products seem not to have been controlled in that way. In general, however, people cannot be required legally to exhibit public evidence of having thought in a particular pattern nor to affirm that their thinking occurs in a particular pattern.

Under limited circumstances, people may be compelled to witness demonstrations of the efficacy of intellectual products that are being produced under the kinds of controls that define a natural science discipline. Examples may occur when university students are required to take a natural science course as part of their general education before being allowed to concentrate on a specialization. The students in such a course may not be graded in that course according to evidence that their own thinking in general features naturalistic assumptions, but their grades can be based on their descriptions

of that epistemological framework (i.e., they can be compelled to describe it, but not to behave in that way in general). However, as a further training step, those students may be guided through the analysis of some phenomenon in a narrowed training context that has been contrived to insure that their thinking probably remains objective during that exercise. The activity is kept within the national constitutional purview by treating it explicitly as the form of pretense known as *practice* (i.e., the students can be required to *pretend* that they are objective scientists in order to experience a sample of that kind of objective analytical activity). Those students cannot be penalized if the objective aspects of their behavior do not generalize to situations beyond that training exercise.

The issue of a person's right to any style of thought becomes more muddled when a candidate is being considered for acceptance into a natural science training program or to fill a vacancy on the program faculty. Within publicly supported institutions of higher education, the academic units are officially distinguished only on the basis of subject matter. To the extent that a physics, chemistry, or biology department faculty reflects the epistemological perspective of scientific naturalism, it does so only for two main reasons. First, a majority of the faculty members operate professionally from that personal perspective and probably are hired initially because they seem to do so. Second, external professional organizations, having acquired certain credentialling or accreditation privileges, may be exercising some degree of oversight that requires public evidence of a natural science approach to the subject matter by science department faculty members. That imposes an indirect mechanism of selection that tends to insure that a professionally certified person will behave an appropriately naturalistic quality—controlling philosophy with respect to whatever phenomenon is under professional scrutiny in that person's academic department.

The allowance for a departmental faculty to hire new members on the basis of evidence of a candidate's personal epistemological practices without having to account to outsiders for doing so represents a practical compromise with the First Amendment to the United States Constitution. Within academic institutions, that compromise is deemed necessary to assemble a group of faculty members that can endow a natural science department with the distinctive traditional intellectual integrity that characterizes its discipline. Currently that approach to the hiring of academics helps somewhat to insure that natural science departments continue to be staffed with persons whose professional activity is informed by a philosophy of naturalism.

However, such hiring practices cut both ways, as they say. That method of hiring helps to insure that some other kinds of academic departments remain staffed by

persons whose professional activity is quality-controlled according to certain kinds of superstitious assumptions that are generally respected among practitioners of the disciplines that those departments represent. Thus, many social science departments have come to be staffed exclusively by faculty members who assume that the behavior exhibited by a human body is essentially spirit-driven, be that spirit a rather secular and willful self-agent or a religiously inspired soul-like ethereality.⁴

Under all such assumptions, the environment does not exert a strict functional control over behavior. Instead, at most, parts of the environment may be taken discretionarily into some degree of account by the responsible indwelling manager. Details about the neurological activity through which that agent is presumed to produce behavior are often brought to bear in scholarly service to that basic assumption. Physiological studies of the ongoing neural activity during the production of observed behavior tend to shift attention away from the scientifically unfashionable superstitious assumption that that behavior is both originated and initiated by some kind of self-agent. Thus, evidence from brain science may be adduced in scholarly explications of what are assumed to be the operations of the agent. To the extent that it is acceptable to be explicit about the supernatural,

⁴ As noted earlier in this book, such assumptions support the concept of personal responsibility insofar as under those assumptions operant behavior is the discretionary product of a willful agent (called the *person*) that must then be held accountable. If the individual exhibits a pattern of rather consistently abhorrent behavior, the individual may be deemed to be intrinsically evil in the sense of being host to an evil person-agent—or in the opposite case, saintly. In analyzing behavior from that general perspective, both the conditioning of behavior and the implications of such conditioning are neglected, because a conditioning process is of little or no relevance with respect to behavior that putatively happens according to the will of an entirely or mostly autonomous agent. Under such assumptions, the analysis of behavior would instead have to focus on the nature of the putative agent that discretionarily and willfully originates and oversees the execution of that behavior. In some versions, especially those promulgated by certain religious agencies, the intrinsic spiritual self-agent can come under the influence of powerful external spirits that may compete for their respective shares of such control. Some Christian versions feature the *Devil* and *God* in those oppositional roles, but those putative ethereal external agents merely allude respectively to sets of contingencies that produce behavior that respects or disrespects the moral and ethical code of conduct that is prescribed under the prevailing religious ideology.

those accounts may be asserted to reveal certain aspects of an ethereal self-agent's use of some neural body parts in the exercise of its will. On the other hand, where such blatant superstition is unfashionable, evidence of the neural activity may be presented in support of some concept of "how a person thinks." Such references to persons thinking are typically left vague with respect to the presumed nature of both *person* and *thought*.

Again, as always, philosophy matters. The basic agential assumption affects just about everything that happens under the professional umbrella of an academic department that is organized around it. Included are the curricular decisions, such as the selection of the subject matter to be taught, the kinds of objectives established for the students with respect to the subject matter, and the nature of the pedagogy that is practiced by the faculty. For instance, these would all tend to be different depending on whether the faculty members of a social science department behaved a superstition-based philosophy or a natural philosophy by which their data on social phenomena are interpreted.

The scientists who now work in a natural science department within a public university may assume that they are officially sanctioned by their institutions to maintain the naturalism that informs the kind of scientific practice that has come to be definitive of their field. However, the general faculty members in units beyond the natural science departments, as well as the central administrators of such institutions, are formally entitled to recognize a kind of departmental integrity that pertains only to the distinctiveness of its subject matter (i.e., to *what* is studied), not the personal epistemology of the faculty members (i.e., to *how*, intellectually, it is studied). To the occasional dismay of some faculty members in the natural sciences, that is the perspective from which many administrators as well as faculty members from other departments tend to approach that issue.

The faculty members in a given natural science department may argue that the philosophy of naturalism affords the best available quality-control for the scientific practices that are required to probe the kind of phenomena that are of concern in that field. However, in an institution that is supported by a population with a vast majority of strongly superstitious people, and in which a substantial majority of the faculty members and administrators also behave in similarly superstitious ways, it usually remains counterproductive to raise the issue of qualitative comparisons among differing epistemological and ontological perspectives no matter how relevant that issue may be.

Institutional administrators and faculty members who work outside of the natural science units may point to what they construe to be an intellectual imbalance in the faculty of a natural science department. Such external critics may

even argue that that department is deficient in representatives of certain epistemological perspectives apart from scientific naturalism that they regard as essential to the interests and welfare of human beings. Although such assaults against physics, chemistry, and biology departments have become rare in modern times, such hostile criticism remains especially likely with respect to those very rare social science departments in which natural scientists of social phenomena have attained a majority.

Furthermore, most university administrators respect the general principle that any strongly represented epistemological perspective in the general population outside of the university (as well as the concepts and the intellectual operations that are supported by that perspective) should also be proportionally represented among the faculty members of any university that public tax dollars support. Thus, administrators in public universities often tend to regard the maintenance of intellectual balance as an element of prudently political democracy, and they accept the maintenance of such balance within their institutions as one of their professional responsibilities.

Within a university, that intellectual diversity may remain interdepartmental, manifesting across the various departments each of which maintains its particular internal intellectual integrity. However, administrators may also intervene in that regard at the departmental level, which some administrators believe to be the organizational level at which such philosophical diversity should manifest. Within their institutions, they act to insure that an epistemological mix is reflected intradepartmentally.

The two most frequent forms of enforcement with respect to unit faculties that are deemed to have become too naturalistic are (a) refusal to approve the further hiring of additional persons who seem to interpret relevant data on the basis of naturalistic assumptions, and (b) the imposition of requirements that natural scientists assert or acknowledge in their classrooms that superstitious assumptions can also lead to useful and valid interpretations of data. A typical tactic is simply to assign a natural scientist to teach courses with previously fixed curricula and designated textbooks all of which have undergone content adjustments to present a balance between naturalism and its alternatives. If a faculty member refuses to engage in such a contradiction of personal intellectual integrity, that faculty member, if without tenure, is subject to a simple nonrenewal of annual contract. A tenured faculty member who would refuse to accept such a violation of personal integrity is typically subject to so many forms of career inhibiting harassment and retribution that, arguably, relatively few who are subjected to such coercion tend to assert themselves in that way.⁵

⁵ A natural scientist who regards superstition as counter-humanistic and on that basis refuses to teach it as if it

Thus, absent a respect for qualitative criteria pertinent to different ways of coming to know, the otherwise worthy quest for balance, equity, and fairness within a university can result inadvertently in a degradation in the capacity of a departmental faculty for intellectual effectiveness. That occurs if the quest for diversity is extended to the level of respective personal philosophy among the members of each departmental faculty. That kind of error in managing intellectual diversity implies a respect only for philosophical difference coupled with disregard for the qualitative implications of the differing philosophical perspectives.

While a faculty member's skin shade probably has no direct functional effect on the quality of that faculty member's professional work, a faculty member's philosophical repertoire certainly does have such an effect and does so in ways that have relevant, substantial, and important qualitative implications. Pressure for equal epistemological and ontological representation among faculty members *presupposes* that a touted alternative is potentially worthwhile, and advocacy for it often manifests as a demand for the inclusion among the faculty of persons who are conditioned to think in that way. Absent a qualitative comparison, a person who thinks objectively about the subject matter may be excluded to make room for a person who thinks superstitiously about the subject matter.⁶

represents a potentially worthwhile alternative to a naturalistic perspective may do so on two bases. First, that scientist can publicly decline to breach professorial integrity by teaching as worthwhile an intellectual mode that that professor regards as fallacious nonsense, which relies on the protective umbrella of the First Amendment. Second, that scientist can build a career that is established largely outside of the institution in which he or she is employed. That is accomplished by insuring that the important entries on one's professional résumé pertain largely to accomplishments the definitive variables of which are accessed outside of the institution in which one is employed (e.g., professional publications, convention presentations, positions in state and national professional organizations, appointments to government posts, etc.). That hinders the hostile manipulation of one's career-defining opportunities by political enemies within the institution in which one is employed. Local administrators may attempt to regain control by insisting that the criteria for faculty performance evaluations must include the requirement of a substantial percentage of local service, a faculty member's opportunities for which they can then manipulate politically.

⁶ A contemporary example is the effort to install creationists among science department faculties by people who assume that natural complexity is indicative of a mysterious

Such a result conflicts in one important way with the purported cultural mission of the institution. That is, insofar as the interpretation of data on the basis of superstitious assumptions yields less effective outcomes, the capacity of that university unit to produce worthwhile products will have been reduced. If the qualitative criteria for the outcomes of such scholarly work pertain to the ratio of positive reinforcement to aversive stimulation (a.k.a. the quality of life) for the ultimate consumers of the intellectual products, then it remains difficult to find examples in which superstitious assumptions inform a higher quality of scholarly work than do the assumptions of scientific naturalism.

Whenever superstitiously produced assumptions and naturalistic assumptions are mentioned in a contrasting way, one must recall the nature of their respective origins. Basic assumptions of naturalism tend to arise by induction from a vast array of objective data, while, in contrast, superstitious assumptions tend to arise constructively—that is, they are invented without natural constraints to serve in pseudoaccounts of contacted events.

To the extent that intellectual diversity may be worthwhile, let us consider the circumstances under which that is and is not true. Suppose that the diversity manifests in the form of different theories that are derived from respective sets of relevant data. We regard that diversity as worthwhile if all of those derivations represent objective exercises performed on available but limited sets of objectively produced data. The theories differ, not because the data have been interpreted on the basis of differing assumptions about nature, but because those theories are based on different sets of relevant data.

supernatural designer who has been endowed with whatever mystical powers would be required to rather spontaneously produce whatever natural complexities are observed. While revelation of the complexity in nature is acceptable to nearly everyone, its explication through recourse to superstition represents a disciplinary departure from natural science. A further step involves forcing natural scientists, when teaching in their classrooms, to pretend that (a) explanatory recourse to mysterious creators and (b) reliance on mechanical and selectional causality represent equally acceptable and implicitly worthy intellectual exercises. A more extreme version of such violations of intellectual integrity at the personal level already occurs routinely in Social Science Departments in contemporary universities. Specifically, it is now quite common for the relatively few natural scientists of behavior who have found work as Social Science faculty members to be required (or to be coerced) as a condition of employment to account for behavior by teaching as potentially valid the superstitiously invested principles of personal agency.

However, a new theory that is merely constructed interpretively to comport with superstitious assumptions represents an intellectually corrupted kind of diversity that contributes little if anything to furthering the cultural mission of a university.

Confounding those two classes of diversity is a common mistake the avoidance of which can be facilitated through recourse to the behaviorological specialization that we may designate as *comparative intellectuality*. That is one aspect of behaviorological science that a cultural institution, purportedly existing to foster intellectual development, can ill-afford to neglect either in an administrative or curricular way.

More specifically, the appropriate kind of intellectual diversity within a university obtains among objectively derived yet conflicting theories. Such conflict remains unresolved only for temporary lack of sufficient and relevant data. Persons who exhibit explanatory recourse to superstition commonly produce theories that are intrinsically invalid, not because of an insufficiency of relevant and valid data, but because those data are interpreted so as to comport with superstitious assumptions.

Such theories are intrinsically invalid from the outset, because they do not pertain to relations that feature exclusively real variables between which a flow of energy can be traced. Furthermore, cluttering the theoretical landscape with a proliferation of theories that are inherently invalid because of the way that they are produced can confuse consumers of the intellectual products of the institution and unnecessarily multiply the difficulties of the academic mission.

Scientists and scholars, when free to operate objectively on the basis of naturalism, can pursue the important work of generating and resolving conflicts among what remain potentially valid theories. However, confronted with a proliferation of invalidly constructed theories, natural scientists and scholars must divert personal resources wastefully at an unproductive level of contention. That raises the question of why an invalid class of theories that arises on the basis of superstitious assumptions should not be subject to preliminary disqualification before they are entertained in the academic arena.

In universities, regardless of the field of study or the discipline by which that study is conducted, in the normal course of academic operations two classes of events are ideally subject to culling according to qualitative criteria. The first class of events consists of relevant operant behaviors, and the second class of events consists of the procedures by which those operant behaviors come to be conditioned and controlled in the first place.

Many of the important behaviors in scientific and scholarly activity are verbal as are many aspects of both their conditioning and residual controls. To put it in common parlance, universities exist not only to sort out

ideas according to their efficacy but to sort out the ways of thinking by which ideas are generated in the first place. The grand contest of efficacy, which universities exist to conduct, pertains not only to what is said and done there about human interactions with the environment, but also to the ways and means by which the relevant behavior is generated and maintained. It is not only that superstitiously established ideas tend to be inefficacious, the superstitious nature of the controls under which such ideas emerge is of an intellectually inferior quality that merits preliminary disqualification in the academic arena. The problem inheres in distinguishing among patterns of behaving with respect to which people may have become complacent.

Also, some people may argue that the intrinsic academic operations of universities should feature precisely such contests of efficacy—contests that pit superstitious philosophical foundations against non-superstitious philosophical foundations, especially when the kind of superstition in question pertains to the nature of human beings and their behavior. A counterargument is that such a contest would amount to a waste of the university on what should already be a well settled issue and that the quality-maintaining mechanism that the university represents should be focused on more relevant and important issues than the relative efficacy of objectivity and superstition.

Apart from the question of whether a university faculty and administration should pursue an academic mission that features a mix of superstitiously and objectively informed activity, the relative efficacy of superstition and objectivity remains suitable subject matter for inclusion in the curriculum. That is, students who cannot yet respond effectively to that issue should receive instruction pertaining both to the contrasting nature of objectivity and superstition and to the kinds of contingencies that have fueled the conflict between their respective proponents. But arguably, confusion among naive students about that issue should no longer be matched by a similar confusion among those who operate the institution. That is, confusion about the potential validity of superstition should no longer muddle the intrinsic operations of a university. The extent to which that continues to occur affords a qualitative measure of the effectiveness and efficiency of universities in general or of a particular institution. Superstitious intrinsic pollution is an important criterion by which prospective students and their supporters can evaluate the suitability of a prospective institution to provide a worthwhile higher education.⁷

⁷ Intrauniversity academic operations define an applied specialization within behaviorology. An institution that relied on superstition in its internal operations and which touted recourse to superstition in its curriculum would presumably be doing so because its operators lacked sufficient training in the natural science of behavior and

Let us now return to the phrase *natural science*. In the verbal behavior of various individuals the tact *natural science department*, if uttered in response to a certain unit in a public university, is not necessarily evoked by the same intrinsic properties. Persons *outside of* the natural science community tend to produce that tact in response to certain classes of events that are studied in such a department (i.e., the general kind of subject matter that is studied there such as energy, matter, life forms, etc.). In contrast, persons *within* the natural science community tend to emit that same tact (*viz.*, *natural science department*) under stimulus control of the kind of philosophical verbal behavior that ideally shares in the control of the scientific practices of the departmental faculty members. In common language, within the university the phrase *natural science* does not “mean the same thing” to people who represent the natural science community and to people outside of it. The two groups may be said to “have different respective concepts” of *natural science*.

For example, people outside of the natural sciences may argue that the study of a particular supernatural phenomenon belongs in whichever natural science department studies the class of real events to which that superstition most closely pertains. Consider a rather common kind of example: Some such outsiders may assume that the origination or arrival of a soul invests an embryo with its vital human essence. They argue that the nature of souls and their relations to human bodies be studied in biology departments, because a soul pertains to the vital nature of certain life forms, and life forms constitute the general subject matter of biology departments.

Natural scientists in biology departments would tend to resist the addition of such subject matter to their curriculum, because the superstitious kind of knowing that establishes the putative ontological status of souls is qualitatively out of bounds relative to the natural science perspective. That superstitious kind of knowing-behavior represents a kind of ontology and epistemology that does not comport with the philosophy of naturalism. At issue is whether the curricular content in a biology de-

its underlying assumptions. Whether teaching, administering, or doing research, interpretations occurring under the control of superstitiously crafted assumptions would be degrading the effectiveness of the outcomes. Such a general behavioral problem, which typically stems from a broad lack of training in a critical natural science and its philosophy, is similar to the physical problem that would inhere if the institution's buildings had been designed and constructed by people who had never been trained to respect the principles of physics and the underlying natural philosophy. During practical operations the adverse implications of neglecting any one of the basic natural sciences tend to prove inescapable.

partment is to be determined only by general thematic criteria or whether the subject matter must also pass the quality-controlling tests to which people refer as a respect for naturalism.⁸ In a natural science subcommunity such as biology an element of legitimate subject matter must not only be thematically relevant, it must also originally have come to be known in an epistemologically acceptable way. That is, the behavior of knowing it must have been conditioned through relevant scientific practices that insure the quality of objectivity.

Ironically, other than among the natural scientists themselves, the academic units devoted to the natural sciences are not officially recognized as such on the basis of the most essential and critical aspect of the natural sciences—namely, the philosophy of scientific naturalism. Thus, the natural scientists within public universities are compelled to rely only on informal support in their efforts to maintain the epistemological integrity of their disciplines—a delicate and often tenuous kind of support that they have cultivated across the past few centuries.⁹

⁸ This is usually a somewhat easy distinction with respect to *souls*, but with respect to the secularized versions called *selves* the distinction often proves to be more difficult.

⁹ A few private universities that are formally committed to scientific excellence may effectively support and protect the epistemological integrity of their natural science departments. However, in private universities that are sponsored by superstitious factions of the general population, and which exist in part to indoctrinate (i.e., condition) students in the particular kind of superstition respected within the sponsoring faction, the faculty members in the so-called natural science departments of such universities are often explicitly screened to preclude the presence of individuals whose personal philosophical verbal behavior meets the criteria for a comprehensive scientific naturalism. In the resulting science departments, scientific methods are emulated, but the curriculum is culled to eliminate the objective treatment of topics, themes, or phenomena that are exclusively reserved for superstitious treatment within the population segment that sponsors that institution. The science that is then practiced there (pertinent only to permitted themes) establishes facts that are then subject to a kind of superstitious interpretation that is presumed to be beyond the reach of scientific thought. In that way, the implications of scientific findings are not only prevented from contradicting the dogma of the sponsoring community but are interpreted as if to support it. The science faculty members in such institutions are thus intellectually constrained. Their own scientific findings must be entrusted to the community for what is deemed to be a proper interpretation in light of the prevailing superstitious assumptions,

Support for the critical naturalism that characterizes the verbal behavior of natural science faculty members inheres mostly at the policy level and relies for its maintenance on the tendency to tolerate extensions of operational patterns in proportion to their endurance (a.k.a. respect for tradition). But like all academic traditions, they remain vulnerable to abrupt formal redirection.

In The United States of America, the constitutional prohibition against the governmental establishment of religion was originally installed mainly by people who could not reconcile the conflicting differences among their respective varieties of religious superstition. They were concerned with protecting their own respective religious establishments from governmental imposition of the potentially contrary superstitions of some other religious segment of the population that conceivably could gain control of the government, perhaps quite legitimately via the electoral process.

In modern times the natural science subcommunities that operate in the academic departments of public universities have been able to rely on that constitutional provision for judicial protection of their curricula against intrusions of “religion.” Through that kind of defense most intrusions of religious varieties of superstition, the general kind with which the natural science curricula have most often been threatened, were kept at bay. Thus, a student in a public university, to the extent that such an institution represents a governmental operation, remains protected, at least in part, from what is regarded as superstitious indoctrination at the hands of the governmental agency of education. More specifically, the subject matter to which scientific attention may be directed in such institutions is not subject to culling according to superstitious criteria nor must the findings from scientific

and they are expected to concur with such interpretations. B.F. Skinner noted in chapter 1 of *Science and Human Behavior* (p. 6) that science not only establishes facts but supplies its own wisdom. Science leads not only to the induction of specific principles pertinent to particular subject matters but also to the induction of philosophical assumptions by which to make sense of its own discoveries in relation to the world at large. Those who operate universities in service to superstition-based communities are reluctant to let their resident scientists go that far, and their methods of control include conditioning members of their science faculties to avoid doing so. Thus, routine aversive conditioning can leave a member of the science faculty feeling guilty, shameful, or sinful in the event of an impending interpretive deviation from the prescribed dogma of the sponsoring community, while interpretations that hew to the prevailing ideology may result in contacts with an assortment of socially mediated reinforcers.

inquiries be interpreted to comport with the assumptions that underlie superstitiously informed dogma.

A modern counterstrategy by the forces or organized religious superstition has been, first, to divorce one of its most fundamental ideas (viz., the complexities of nature require intelligent design) from formal religious categorization and then to appeal on the basis of fairness and balance in behalf of its inclusion in natural science curricula. That approach has been met by only one of two obvious levels of resistance from the natural science community. Namely, it has been argued that the intruding superstitious idea is essentially religious regardless of the seemingly secular casting of its current spin and therefore remains subject to constitutional prohibition.

To the extent that that defense would fail, especially in its judicial tests, the natural science community could be left, apart from acquiescence, with no alternative other than to incorporate religious superstition within the target of its long-standing general activity against superstition—or at least the kinds of religious superstition that fuel intrusive interferences with scientific programs. The natural science community has traditionally waged that campaign on the basis of the general inefficaciousness and unreliability of any kind of superstitious knowing and on the basis of the inferior intellectuality that is connoted by recourse to superstition in the process of coming to know. With respect to its intrinsic quality, arguably, no kind of superstitious thinking merits an exemption. However, within contemporary culture the forces of organized religious superstition are strongly established, and the contemplation of activity against the interests of that powerful cultural entity tends to elicit trepidation.

Preparing the Natural Science Community for Further Service to Human Culture

Given any natural phenomenon (i.e., any measurable and therefore real event), theoretically, an objective way of studying it exists or can be developed within the purview of science. As natural scientists are often quick to suggest, anything that is measurable (i.e., real) can be studied from a natural science perspective. Given a real phenomenon, it may not lie within a particular natural scientist's field of specialization, but it will almost surely lie within some other natural scientist's field of specialization (and if not, it potentially could do so).

An often posed question asks how superstition can survive or coexist with scientific objectivity insofar as they are antithetical. But in many situations those interpretive perspectives do not interfere with each other. Note that while objective study establishes facts that pass tests for reliability, various parties who subsequently will exhibit quite different interpretations of those facts may all appreciate the reliability that scientific study imparts to the facts that it establishes. Given the objectively pro-

duced facts, the respective interpretations of those facts by the disparate parties then tend to serve the contingencies under which the relevant investigation or its review was undertaken.

For instance, both a natural scientist and a religious creationist may favor studies that are sufficiently objective to establish the irrefutable nature and order of certain rock strata—data that both parties may find useful when digging wells, developing mining operations, and cutting roadways through mountains. But while a geologist may *interpret* those stratigraphic data as evidence of successive cycles of encroachment and retreat by a 700 million-year-old sea, a religious creationist may *interpret* those same data as evidence of how God stacked the rocks when quickly and miraculously creating the world only several thousand years ago.

In such cases, the events featured in the superstitiously informed interpretations always lie beyond the purview of the interpreter's practical experience. Consider a superstitiously informed creationist who treats important practical matters with objectivity and behaves logically with respect to practical interests. The presumed miraculous involvement of the creator, as cast by that person, tends to recede deeper into the haze of antiquity safely beyond the milieu of functional relations that define the person's current practical concerns. Currently, for a natural scientist working in the field of cosmology who suffers a lingering susceptibility to that kind of superstition, the miraculous creation of the universe may have receded all the way back to the Big Bang.

As noted, some members of the contemporary natural science community have stopped short of the general conclusion that natural philosophy always trumps superstition in the grand contest of efficacy. With respect to work in their own specialty, they may be prepared to argue that not only should natural science prevail in that specialization, but so should naturalistic interpretations. However, at the same time, from their somewhat parochial perspective, they may agree that superstitious inquiry is perhaps better, or at least acceptable, with respect to some subject matters that lie beyond the concerns that define their own field of inquiry. Or, while insisting upon objective science for all inquiries, they may nevertheless accept interpretations of objectively produced data that have been rendered according to superstitious assumptions, especially with respect to certain matters that lie outside of their own fields.

Other natural scientists in similar circumstances have exhibited a different reaction. After observing that functional accounts tend to emerge given sufficiently persistent objective inquiry, they have arrived by induction at the principle of primacy for naturalism and for the kind of practices that it informs. While as individuals they cannot be specialists in all fields, they have come to as-

sume that the natural science perspective affords the most efficacious approach to any real phenomenon whether in their own field or in another field. They also assume that a philosophy of naturalism affords the most promising interpretation of the findings.

They may insist that, because of their more cosmopolitan perspective on natural science, they have thereby attained the highest rank of membership in the natural science community. In their elevated perspective, the members of the former group represent a subclass that has yet to attain full intellectual status in the natural science community, because when considering matters that are beyond the limits of their own respective specializations those seminaturalists may unabashedly exhibit or at least tolerate explanatory recourse to superstition as an alternative to a more objective approach.

A substantial debate within the natural science community is thus framed: Is there really any class of measurable events for which the outcomes and implications of natural scientific study do not serve human culture better than the outcomes and implications of a superstitious treatment? If any phenomena are asserted to be such, would the natural scientists in whose specializations those events fall also agree with that assessment? Once those scientific specialists entered their kind of outcomes into a contest of efficacy in competition with the kind of outcomes provided by the purveyors of superstition, would the natural scientists prevail, and what kind of criteria would have to be respected for them to do so? If the interests of certain individuals are well served by investments in superstitious behavior, is their community in general, and the culture of which it is a part, equally well served? That is, when individuals prosper by indulgence in superstition, what are the long term implications of their doing so for the culture of which they are a part?

These queries implicitly throw the gauntlet of naturalism before the superstitious throng, but should it be picked up with respect to specific phenomena, the natural science community may find that to win many of the ensuing contests it must have inducted the behaviorologists well into its own ranks. [The "Editor's Note" after the References supplements this point with information from related sources.—Ed.] That is because many of the classes of phenomena with respect to which troublesome problems arise are defined by variables that lie beyond the effective range of physics, chemistry, and biology. The substantial control of the culture that is enjoyed by purveyors of superstition is largely effectuated by focusing on events in the subject matter of the one major basic natural science discipline that the natural science community has tended to neglect. That basic natural science discipline has its own level of analysis for the study of an important class of real phenomena that the traditional basic natural sciences do not subsume and which the purvey-

ors of superstition have been allowed to claim as their exclusive operational domain.

Our world is plagued by acts of terrorism that are informed by superstitious assumptions, and wars are fought to protect investments in the implications of superstition. Vast numbers of people suffer, many horribly, under irrational laws and policies that have followed from superstitious interpretations. Such strictures are typically enforced with intense patterns of behavior that are said to reflect righteous conviction, as if intensity of belief could acceptably substitute for objectivity. Many of the problems that arise in connection with such tragic circumstances pertain only in tenuous and peripheral ways to the nature of energy, the structure of matter, and the biological processes of life. It is to human behavior that those problems often pertain directly and, importantly, less to *how* the behavior happens than to *why* it happens.

There is a natural science that exists for the address of precisely such matters. But the natural science community must be rendered complete if it is to bring that discipline to bear in ways that can preclude superstition-fueled hostilities and alleviate suffering that now occurs under constraints imposed in respect of superstitious assumptions. The quality of life has been improved greatly in various ways that define the effective reach of the traditional natural science disciplines, but the lack of a natural behavior science among them has resulted in a human culture that is increasingly characterized by the accumulating implications of that neglect. That is, although contemporary human culture is characterized by people who can live a hundred years, travel through space in rocket ships, and clean their clothing in wondrous and easy ways, they nevertheless tend to babble about behavioral events in often simplistic and intellectually immature ways that too frequently spawn foolish and harmful practices that result in unnecessary suffering on a vast scale.

Insofar as science and philosophy manifest as ways of behaving both muscularly and neurally, as does superstition, behaviorology is not only the natural science of science and the natural science of philosophy, it is also the natural science of superstition. . . . Contemporary culture is coming to be dominated by increasingly organized superstition the most touted benefits of which arguably can be duplicated or replaced through an objective approach. The literature of applied behaviorology is devoted to numerous and various instances of recourse to the objective alternative.

Nevertheless, continued respect for superstitious assumptions often takes the form of irrational practices that result in vast but preventable human suffering of various kinds. Such superstition represents a behavioral cancer of the cultural integrity to which the natural science community has not been prepared to respond most effectively. Traditionally, natural scientists have made remarkable

progress in improving the external environment and in the repair and maintenance of bodies, but increasingly, the most threatening problems pertain to human behavior per se. Without behaviorology among the disciplines that the natural science community can bring to bear, the natural science community continues to facilitate comfortable individual lives the majority of which are behaved in service to what arguably amounts to a preventable retardation of cultural progress, often through discrediting natural science per se.

For example, consider persons who are meeting to plan a strategy by which students in public schools may be permitted to substitute courses in Bible study for currently required courses in the natural sciences. They are likely to have driven to that meeting in automobiles. Most or all of them will probably arrive well nourished and in a state of well maintained good health. They will tend to be dressed comfortably and attractively in clothing that is made from a variety of fabrics the fibers of which were invented by chemists. However, it is not via physics, biology, nor chemistry that the most effective case can be mounted by the community of natural science to counter their superstitiously informed objective. Behaviorology is better matched to the demands of that challenge.✻

References

- Fraley, L.E. (2008). *General Behaviorology: The Natural Science of Human Behavior*. Canton, NY: ABCs.
 Skinner, B.F. (1953). *Science and Human Behavior*. New York: The Free Press. ✻

Editor's Supplement to Natural Science, Superstition, & Academic Institutions

Must Correct Missed Chance

Perhaps the present scenerio of natural scientists needing to fully induct behaviorology to our culture's natural science roundtable would not have occurred had behaviorology emerged out of one or another already extant natural science discipline rather than originating as it did as an ever unwelcome part of a non-natural-science discipline (psychology). Actually, behaviorology came close to emerging from biology, as B.F. Skinner (the foundational natural scientist of behavior) came close, in the 1930s, to taking his degree through a biology department.

Skinner had early on begun using the life-science *selection* paradigm, typical of the natural science of biology, in the task of developing a natural science of behavior, especially the behavior of people. Even though Skinner was operating within the department of psychology at Harvard University, he did much of his pre-graduation work under W.J. Crozier, the head of the physiology branch of Harvard's biology department (Skinner, 1979, p. 16; also see Ledoux, 1997/2004, and Fraley & Ledoux, 1997/2006). Crozier had been a student of the biologist Jacques Loeb, and both Crozier and Loeb had emphasized the causal mechanism of selection in their natural science work. Skinner, perhaps without initially realizing he was doing so, transferred the concept of selection from biology to behavior relations. He thereby brought a particular natural science paradigm to bear on the questions of a naturalism-informed scientific study of behavior.

Unfortunately for our present circumstances, even though he did not then, or ever, fit psychology philosophically or scientifically, Skinner officially took his degree through the psychology department, precipitating the current disconnect between the natural science of environment-behavior relations and the rest of the natural science community (whose students have hence for decades generally ended up taking traditional [superstitious] psychology to fulfill undergraduate graduation requirements). Thus, the community of natural sciences, arguably to serve its culture's best interests (and give its students a more appropriate behavior-related discipline to study to fulfill undergraduate graduation requirements), needs now to take the steps to include behaviorology at its roundtable as soon as possible, implementing full support for behaviorological programs and departments, etc.—Ed. ✻

References

- Fraley, L.E. & Ledoux, S.F. (1997) Origins, status, and mission of behaviorology. In S.F. Ledoux. (2002). *Origins and Components of Behaviorology—Second Edition* (pp. 33-169). Canton, NY: ABCs. Reprinted (2006-2008) in five parts in *Behaviorology Today*: Chs. 1 & 2: 9 (2), 13-32. Ch. 3: 10 (1), 15-25. Ch. 4: 10 (2), 9-33. Ch. 5: 11 (1), 3-30. Chs. 6 & 7: 11 (2), 3-17.
 Ledoux, S.F. (1997). An introduction to the origins, status, and mission of behaviorology: An established science with developed applications and a new name. In S.F. Ledoux. (2002). *Origins and Components of Behaviorology—Second Edition* (pp. 3-24). Canton, NY: ABCs. Reprinted (2004) in *Behaviorology Today*, 7 (1), 27-41.
 Skinner, B.F. (1979). *The Shaping of a Behaviorist*. New York: Knopf. ✻

Natural Sciences II Building This Building accommodates IT Services, the Electron Microscope Unit, the Centre for Microbial Ecology and Genomics. From <https://3dwarehouse.sketchup.com/model.html?id=d48d84225416eced...> university, building, academic institution. Upload a photo. This Building accommodates IT Services, the Electron Microscope Unit, the Centre for Microbial Ecology and Genomics. From 3dwarehouse.sketchup.com/model.html?id=d48d84225416eced... When Mathematics moved out in 1982, it became known as the Applied Mathematics building and is currently known as the Natural Sciences II building. For more information, visit: <hdl.handle.net/2263/6924>. Add place (company, shop, etc.) to this building. Natural science can be divided into two main branches: life science (or biological science) and physical science. Physical science is subdivided into branches, including physics, chemistry, astronomy and earth science. These branches of natural science may be further divided into more specialized branches (also known as fields). Natural sciences use tools from formal sciences, such as mathematics and logic, converting information about nature into measurements which can be explained as clear statements of the "laws of nature". The "Natural Sciences". Table of Contents. 1 Cr Statement on Part II teaching for 2020-2021 - NST Part II Psychology Due to the effects of the Covid-19 pandemic and government guidance, we have had to make some changes to the way we deliver our programme in order to mitigate against risks to health and to give you the best possible academic experience. We will be providing you with more information at the start of the academic year, and as the year progresses. At every point, we are encouraging students to provide feedback to ensure we are aware of the student learning experience and to allow any changes to be made if necessary. The planned changes are