

CONSTRUCTING REALITY: An Exercise of Freedom

Consider the hypothesis that intelligence has *limitations*, like the limitations in speed, range and image quality of an ordinary still camera. There are some things intelligence cannot understand at all; as to things it understands, it is better at some things than at others; and it puts its own marks on both its contents and on material things — and the marks may tend to distort or obscure the content. Between a region of endeavor that yields easy success to intelligence and one where all attempts seem foredoomed to failure, there is a middle ground where success can sometimes be achieved, but often only with difficulty and not always with assurance. For example, lawyers and physicists, have work that takes place in this middle ground. In this middle ground, an exercise of freedom may be necessary or useful.

Taking place in a middle ground, an exercise of freedom is difficult to view directly. This essay views it indirectly from several directions. Three major directions are examined in each of three Parts.

Part I, “the experience of freedom,” provides a vocabulary and a way of thinking about freedom that is grounded in personal experience that is shared in common. The reader can judge the validity of the approach on the basis of his or her experience..

Part II, “the construction of the object,” is independent of but consistent with Part I. A model of psychological processes is described, where each process accomplishes certain functions of intelligence, but where each process also incorporates certain limitations and the limitations shape the products of intelligence. Collectively, the processes model how we construct “objects,” (e.g., material objects (as we experience them), concepts, words, systems). An object: (a) can, at least by supposition, be conceived separately from its surroundings; (b) endures in time; and (c) has characteristics that are confirmed by agreement in different ways (e.g., hand-eye) and/or among different persons. Some objects are stronger in these characteristics than other objects. The construction of an object, particularly a “fledgling” object,” often requires an exercise of freedom.

Part III, “structure and integrity,” studies examples of successful structures constructed by intelligence, especially the science of physics and the American legal system. There are parallels and divergences between any two systems and comparison of the two considered here supports discussion on the nature of law, both physical and judicial, and on causality as an often successful, generally indispensable and fundamentally limited concept. Analysis focuses on the positive role that an exercise of freedom plays in the endeavors of both physics and judicial decision-making.

PART I: The Experience of Freedom

There is an *experience of freedom* that cannot be fully communicated in words but that is at the heart of this essay. Section 1 uses selections from literature to try to indicate and evoke the incommunicable part of the experience. Section 2 uses a more detached approach and analysis to describe that experience partially. Section 3 sets forth an account of the experience of freedom in a broad way that surveys the entire subject matter of the essay. Then, in section 4, there is a “narrow view” that employs a more focused and deeper approach to particular aspects.

Each of us has his or her own freedom and you should not expect that my freedom is the same as your freedom. Some particular features may be the same, but in large measure, there may be differences. I describe my freedom (and perhaps disclose my own limitations) and suggest that the reader look for “resonances” in the reader’s own experience rather than “correspondences.” You must decide for yourself whether this description of freedom, *or one constructed along similar lines*, is going to be descriptive of your freedom. If you construct your own, you can see if our views converge or diverge as the essays progresses.

§ 1: Freedom in Literature

Each of us has his or her own personal experience that includes matters that cannot be expressed in words. For a crude vocabulary (to be refined later), use “objective” to indicate that experience that can be communicated in words and symbols and “subjective” to indicate that experience that cannot be so communicated.

My experience of freedom has a subjective component; that is, there is something about the experience of freedom that cannot be communicated. Presumptively, the same is true of everyone. However, even subjective experience can be indicated and evoked through literature such as novels and the evocation of subjective experience seems to be one reason for literature. One stands at the edge of objectivity, so to speak, and points toward that which is not objective. One can quote the literature and try to explain to another what the words are indicating and evoking and these quotations, indications and evocations may provide an indirect means of communicating something that cannot be communicated directly..

I offer four brief selections from literature that seem to me collectively to say something indicative and evocative about a subjective experience of freedom. Then I state my conclusions about the objective features, as a lead-in to the essay. The presentation of selections is in chronological order.

a. *Vasishtha's Yoga*

The Indian subcontinent has always been the home of intense philosophical inquiry. Freedom is at the center of many Indian philosophies, including that of yoga.

Apparently dating from the eighth to tenth centuries A.D. (pre-modern Indian dates often require approximation), *Vasishtha's Yoga* teaches that a pervasive universal consciousness is the ground

of reality. Our experience cannot be described as either real or unreal but as permeated by both reality and illusion. It is the illusion that prevents us from understanding reality. Freedom results from adherence to a discipline that teaches steadiness of mind and penetration of illusion. (Some of these principles make sense to me, but not others. Caveat emptor.)

In the Story of King Janaka, the king was distressed by philosophical perplexity. While he was "engrossed in deep contemplation, his bodyguard respectfully approached him and said: 'Lord, it is time to consider your royal duties.'" The king first ignored the advice, but then said to himself: "Whatever is gained by action or by inaction is false. ... Hence, let the body engage itself in its natural functions; without such activity, the body will disintegrate. When the mind ceases to entertain the notions 'I do this,' 'I enjoy this' in regard to the actions thus performed, action becomes non-action. ... ¶ Reflecting thus, king Janaka rose from his seat as the sun rises in the horizon and began to engage himself in the royal duties, without any attachment to them. Having abandoned all concepts of the desirable and the undesirable, freed from all psychological conditioning and intention, he engaged himself in *spontaneous and appropriate action*— as if in deep sleep, though wide awake. He performed the day's tasks..." (Abridgment and translation by Swami Venkatesananda published by the State University of New York in 1993 - emphasis added.)

b. *Anna Karenina*

Seen in retrospect, Count Lev Tolstoy's novel describes the disintegration of Russian society toward the end of the nineteenth century through parallels between personal relations and public events. It opens with the famous line: "All happy families resemble one another; every unhappy family is unhappy in its own way." In the unhappy Karenin house, "there was something false about their family life," and its members, including vivacious Anna, her husband Alexei, a careerist bureaucrat, and her lover, Count Vronsky, a military man who resigns his commission for the sake of their affair, alternate between rigidity and impulse. The happy family is that of landowner Konstantin Levin, an ideal of wholesomeness, partially autobiographical (with details of Tolstoy's own disordered life suppressed), who pursues a sincere, steady course; and the novel follows his courtship and marriage and the birth of a child.

In a central passage, Levin disregards the customary division between gentry and peasant and becomes personally involved in the mowing of hay with scythes. At first he is clumsy and the work is onerous. "They cut row after row. Long rows and short ones, rows with coarse or with soft grass. Levin lost all sense of time, he could not possibly have said whether it was early or late. His work underwent a change that brought him enormous satisfaction. Once he had got into the swing of it there were minutes when he forgot what he was doing, everything was easy, and in those minutes his rows were almost as even and well-cut as [the peasant] Prokhor's. But, as soon as he thought of what he was doing and tried to do better, he became conscious of the difficulties and his results were worse."

c. “Heart of Darkness”

Joseph Conrad’s short novel was in the vanguard of the modern era because it addressed one of the first modern genocides, that perpetrated on the Congolese by Belgian colonialists around the beginning of the twentieth century, and because it was an early and deeply introspective exploration of entangled layers of guilt and evasion, deception and self-deception. In 1890 Conrad, just starting his career as a writer, voyaged on the Congo River in a fashion similar to that portrayed in the story and he returned with physical illness and mental distress that persisted through the rest of his life. “Heart of Darkness” was published about 10 years later.

There are many diverse interpretations of the story. My own view is close to that expressed by Morton Dauwen Zabel in *The Portable Conrad* about the author’s general approach. “Thus love, or the sense of honor, or the obligation of duty, or even the social instinct itself, enters the novels as a means whereby the individual is forced out of isolation and morbid surrender. The inward-driving center-fathoming obsession of the tale become reversed toward external standards of value. It is finally the world that save us — the world of human necessities and duty.”

In “Heart of Darkness,” the protagonist, Marlow, describes his youthful journey as master of a small river steamer that travels the Congo to rescue the ivory trader Kurtz, morally corrupted, mortally ill and ensnared in illusions that he apparently recognizes at the hour of his death, when he cries “The horror! The horror!” Marlow himself, similarly if less fatally corrupted, ill and ensnared, survives because of his work.

“I don’t like work—no man does—but I like what is in the work, the chance to find yourself. Your own reality—for yourself, not for others—what no man can ever know. They can only see the mere show, and never can tell what it really means.” Marlow avoided being drawn into what he saw as “monstrous” and “unearthly” images on the bank of the river: “I had no time. I had to mess about with white lead and strips of woolen blanket helping to put bandages on those leaky steam pipes—I tell you. I had to watch the steering, and circumvent those snags, and get the tin-pot along by hook or by crook. There was surface truth in these thing to save a wiser man.”

d. *The Caine Mutiny*

From earliest times, isolated societies of men involved in long ocean voyages have served as settings for dramatic and insightful stories, including those of Homer and Conrad. Herman Wouk’s novel of the American Navy during World War II is a carefully constructed tale of moral ambiguity that revolves around the mutually-destructive conflict between neurotic, barely functional Captain Queeg and the disloyal, hostile officers and crew that man the obsolete ship he commands. At the same time it describes the maturing of the story’s protagonist, Willie Keith, one of the “mutinous” *Caine* officers, who is, at the beginning of the story, callow, spoiled and slack. In an incident near the end of the novel, after Queeg has left the scene, Keith, as executive officer, takes command when the *Caine* has been struck by a suicide airplane and the new captain, Thomas Keefer, a cynical writer and the covert instigator of the “mutiny,” has panicked and abandoned ship.

"All at once [Keith's] vision expanded. He saw the ocean and Okinawa again. There were the green quiet hills and the horizon. ... He felt an immense peace and personal power descend on him, wrapping his shoulders like a jacket. 'I don't know but what we can save this ship,' he said to [another officer.]" Keith commands the crew over a repaired public address system, including the admonitions to: "Keep calm. Just remember your drills and do what you're supposed to do." The men respond to his orders, put out fires and get the engines operating. Finally, he turns to those in the water. "During the rescue maneuverings in the next hour, Willie retained the strangely clear vision and buoyant spirits and slowed calm time sense which he had acquired when Keefer jumped overboard. Nothing seemed hard to do. He made dozens of quick decisions as damage reports poured into the wheelhouse and little emergencies sprang up in the wake of the conquered big ones."

e. Some features of the experience of freedom

I suggest that the experiences indicated and evoked by the literary passages all include: (a) attentiveness; (b) direct and immediate engagement with reality; (c) actions directed at changing reality coordinated with changes in one's own concepts and mental processes; and (d) disregard of anxiety. Any account of freedom must be consistent with these.

§ 2. An analysis of freedom

Focus on a simple "subject task" that requires an exercise of freedom. The subject task is: "verbal description of a visual image." E.g., write a description of the scene you presently see and that is within reach of your eyes, including those parts of the scene that are now behind your head. There is one visual image, based on the physical world and your location in it, and there will be one verbal description contained within a single document that you write.

["Description" is a broad human activity that includes, e.g., the description of physical phenomena through measurements and mathematical formulations and the description of a judicial system through written rules of law and procedure, cases decided by the system and the decisions — hence the subject task can be assimilated to other tasks.]

In general, it is impossible to accomplish the subject task in a mechanical fashion. You must use "judgment" when selecting the visual objects that will be described and the words used to describe them and when arranging words, sentences and paragraphs. This use of judgment is an exercise of freedom. By exercising freedom, you construct a verbal description and thus structure the visual image you see and the description itself.

For example, I am writing this essay in a room of my house I use as a "home office" that includes stacks of shelves stuffed with files, books, office supplies and a myriad of miscellaneous items; a filing cabinet; a table with a cluttered surface, telephones and an answering machine; and, as the major work space, a desk with a computer and other electronic equipment. Writing this short description required me to exercise freedom.

Describing the subject task generates a list of *features*. The subject task has been chosen to highlight an exercise of freedom. Hence, the features are features of freedom in a more general sense.

The first feature is the *purpose* that motivates the description. For example, my purpose in writing the foregoing description of my home office was to be brief, to focus on physical objects and avoid personal associations (the description as it might be written by a visitor) and to use the description as a vehicle for the essay. A longer description of my home office might depend on whether, e.g.: (a) I am writing to a prospective client with the purpose of impressing him with the resources I have available; (b) I am writing to the IRS with the purpose of justifying a deduction claimed on my tax return; or (c) I am writing with the purpose of amusing a friend with the chaotic circumstances of my life.

The purpose does not determine the description. Even after the purpose is known, many features of the verbal description have yet to be defined, including where to start, what to include and how to proceed (the feature of *indeterminacy*). An enormous number of different verbal descriptions can be prepared (the feature of *diversity*). Indeterminacy and diversity interdepend and are treated as a single feature.

It is impossible to predict the description; the only way to find it out is to begin and carry out the writing (the feature of *spontaneity*). A planned structure, like an outline, will often change while the details are being worked out

There is a subjective sense of effort that can be characterized as "wrestling" or "contending" with the subject matter (the feature of *striving*- see Genesis 32:25-29, where Jacob "wrestles" with the Lord and his name is changed to Israel, meaning: "He who striveth with God").

The task is governed by constraints and rules, collectively *discipline*, indicated by the word "should." The verbal description should conform to the visual image: the description should not include words denoting visual objects that are not present in the image (e.g. "a leprechaun sitting on the telephone"); and visual objects important to the purpose should not be omitted from the description. There are sensory features of the visual image that should be respected, such as the floor being "down" and the ceiling being "up." Rules of grammar and syntax should be followed to the extent the exposition is intended to be formal. Additional disciplines may be imposed through criticism and guidelines, e.g. "You should strive for directness of expression, use simple language, be brief and choose your words with exactitude".

That discipline is a central feature of an exercise of freedom may be at first seem surprising: we sometimes think of freedom as an absence of constraint and discipline. In my view of freedom, discipline is essential. The rules and constraints guide purpose, direct spontaneous action and channel striving.

One of the chief reasons we engage in sports and play games is for the enjoyment of freedom; and discipline is essential to that enjoyment. In *The Philosophy of Sport*, Hyland writes: "We have already seen that the constraints that we impose on ourselves by playing a rule-governed

game are arbitrary and sometimes extreme. Yet the experience we have of playing within those constraints is one of freedom. Strange paradox, that subjecting oneself to constraints more limiting than those of everyday life should be experienced as freedom, the freedom of exhilarating play. Yet that is what happens." In addition, disciplines of training and teamwork make the exercise of freedom in sport more efficacious.

Purposeful striving must be *efficacious* to constitute an exercise of freedom. Even if there is purposeful striving, spontaneous choice and discipline, there is no freedom if nothing is accomplished thereby, e. g., if no verbal description is forthcoming. That is, an exercise of freedom must actually produce results.

Consider gambling at the roulette wheel. All the foregoing features of freedom are present, except efficacy is absent: the gambler's purpose, striving, spontaneous choice or adherence to a "system" are not connected to any result. A machine generating numbers randomly could gamble with the same degree of success or failure. The case may be different when gambling at poker if the gambler's interpretations of other players' actions are efficacious. (The roulette gambler is seeking something that is contrary to my concept of freedom but that is sometimes confused with freedom: wish-fulfillment that is "magical.")

Now generalize the particular task of "describing the scene before your eyes" into an organized class of such tasks. E.g., consider an individual who writes such descriptions over an extended period of time, say one description a day for a year. Such a person will show *development* of his or her skills as the year progresses. A course of instruction in writing such descriptions might begin with an easily described visual image and challenge the writer with progressively more difficult tasks.

I suggest that these features (purpose, indeterminacy and diversity, spontaneity, striving, efficacy, discipline and development) constitute a description that is applicable to a class of phenomena where freedom is exercised. In the next two sections, this essays presents an overall view of the world and of our place in it that accounts for these features. First, there is a "broad view" that surveys the entire subject matter of the essay and that draws conclusions from different kinds of phenomena. Then there is a "narrow view" that employs a focused deeper approach to many of the same conclusions.

§ 3 Overview of Conclusions

This essay describes some ways in which we exercise freedom. In this section, the argument and conclusions are condensed to provide an overview. The overarching general thesis is that we exercise freedom when we structure reality, e.g., through technology, descriptions by words and symbols, communications with others and actions based on conceptions of law. I focus on "structuring" because structure mediates between experience and reality and incorporates objective features.

Attempts to structure reality often succeed, sometimes with excellent results. Important successes for my purposes include physics and the American legal system, called "juridical law"

herein.. Swiss psychologist Jean Piaget's description of the development of intelligence in children is a model and a guide. Each subject matter involves an exercise of freedom. That is, physicists, lawyers and judges and growing children all exercise freedom in their activities. I propose an integrated system of principles applicable to these disparate subject matters.

Attempts to structure reality often fail and even successes are limited. I argue that the failures and the limited successes are a result of limitations in human intelligence. Analysis of the limitations is a theme that organizes the system of principles.

I focus on "intelligence," namely, those activities of "mind" developed to deal with a modern culture that incorporates Western (e.g., U.S.A.) social patterns and "second-nature" technology. For example, intelligence is directed at physics research and the practice of law. Obviously, there is broad generality. But there are also other kinds of intelligence that not included. Correspondingly, there are kinds of freedom not accounted for by my approach.

Because Western social patterns and modern technology are shared by a large number of persons each of whom is, apparently, using his or her mind in "the same" way (at least as to substantial subject matter), I feel justified in describing such "intelligence" as if it had independent existence. (I.e., to use the terminology of part II, I argue that such "intelligence" is an "object" and can be treated as a "thing.")

As used in a technological context, intelligence performs functions similar to those performed by representational instruments, such as a camera, and tools for work and/or production, such as a manufacturing machine that "makes" electronic devices. In general, a representational instrument (1) generates accurate images only as to objects that satisfy certain conditions; and (2) introduces distortions and artifacts into the image. Likewise, a tool is suitable for some tasks only and a product of the tool generally incorporates characteristics that limit its usefulness, including the introduction of artifacts. For example an optical lens system such as that used in a camera for still photographs will focus sharply only on objects within a range of sizes and only on those within a range of distances from the front lens; the image will exhibit distortions of shape and artifacts (e.g. wavelike bands or "fringes" around the edges of regions in the image); and fast-moving objects cannot be imaged clearly. I hypothesize that, when directed at reality, intelligence similarly suffers from systematic, incorrigible *limitations*, i.e., restrictions on objects accurately represented by it and distortions and artifacts incorporated into its products.

One consequence of the limitations is that we are not directly aware of them and they must be inferred from analysis of the products of intelligence and the products' successes and shortcomings. Another consequence of the limitations is that, in general, our concepts about reality are approximations and this includes concepts about intelligence. One way to deal with this sticky state of affairs is through a *developmental* approach: start with a narrowly focused model and then modify it to progressively make it more accurate and extend its reach.

A narrowly focused first effort is suggested by successes in other areas of endeavor, such as physics and juridical law. These show that sometimes, when intelligence is narrowly directed at reality, the approximations can be quite accurate and adverse consequences of the limitations may even be wholly avoided, or nearly so, under some circumstances. Moreover, that once an

area of competence has been staked out, that area can be used as a foundation for an increasing range of explorations.

Physics involves a narrowing of the application of intelligence to material phenomena where the adverse consequences of the limitations are reduced; and progressive narrowing so directed leads to closer approximations. Mathematics involves objects of intelligent activity where the adverse consequences resulting from the limitations are reduced to a minimum, almost to a nullity. In physics, intelligence is narrowly applied to those material phenomena that are most susceptible of mathematical description. Hence, as is sometimes said, physics can be "an exact science." The principles and practices of physics are, therefore, a basis for inferences about the limitations of intelligence directed toward reality.

There arises the question of whether the principles of physics, based on narrowed applications of intelligence, apply exactly to material phenomena that are not exactly susceptible to its practices. Typically, physicists believe that their principles apply to all material phenomena. [For example, more fully notated below, Richard Feynman wrote that the quantum electrodynamics he pioneered ("QED") "describes *all* phenomena in the physical world except the gravitational effect" and Steven Weinberg, stated that all scientific "principles can be traced to one simple connected set of laws. ... The reductionist worldview *is* chilling and impersonal. It has to be accepted because that is the way the world works."]

I argue the contrary, namely, that the limited reach of physics and its patchwork texture are evidence that principles of physics apply only approximately, and sometimes not at all, to phenomena outside narrow regions of application. The phenomena accounted for by physics share characteristics resulting from the activity of intelligence that selects phenomena to accommodate its own limitation; and the image of physics is shaped by that selection. In other words, if you want to be exact, you are going to focus on phenomena where exactitude is possible and there is no reason to believe (assuming the existence of limitations of intelligence) that, because exactitude is possible somewhere, exactitude is therefore possible everywhere.

Elaborating on the metaphor of still photography, limitations of that craft can be inferred from the facts that a camera produces sharper and more nearly perfect images by (1) photographing an object nearly stationary with respect to the camera, or, more precisely, photographing an object moving sufficiently slowly that its displacement with respect to the camera is slight while the shutter is open; (2) restricting the object to a certain range of distances from the camera (keeping it within a certain "depth of field"), (3) aiming the camera as directly as possible at the object (putting the object "on-axis"), (4) using the smallest aperture ("stopping down the lens") that will provide sufficient light to capture the image, and (5) narrowing the portion of the light spectrum used for the imaging (thus reducing "chromatic aberration"). Each enumerated item corresponds to a source of distortion or artifact in an optical image and each is expressed in terms of a limiting condition. Moreover, the limiting conditions interact; e.g., quickening the shutter speed to capture a moving object requires the use of a wider aperture to maintain an overall quality of the image. The technology of lenses is directed at reducing the distortions and artifacts; and camera features assist the camera operator in producing the sharpest possible images, e.g., through variable adjustments for shutter speed, focal length and aperture opening and through aiming devices like viewfinders. Some objects, such as a flaming meteorite or a large-scale view

of a city, cannot be photographed without distortion.

A "how-to" manual of photography directed at the advanced photographer might identify limitations arising from the use of lenses and films, from the nature of light and from unsuitable objects. The limitations might even serve as an organizing principle for such a manual. This essay uses a similar approach to explore intelligence. As light is the active "agent" of photography, similarly, freedom is the active "agent" of intelligence. ("Agent" is in quotes because, in each case, the real "agent" is a person who uses light and exercises freedom, respectively.) When we look at photographs we do not see the light that was involved in their production; similarly, when we look at the products of intelligence, we do not see the exercise of freedom that was involved in their production.

Applying this approach to physics, sharper and more nearly perfect representations of material reality are produced by restricting attention to (1) systems involving only a *single class of interactions* and made up of (2) *identical* (3) *particles* in (4) *states* (i.e., conditions treated as unchanging, at least for an instant) described by (5) *clearly analyzed properties* and undergoing (6) *step-like transitions* between states with clearly defined (7) *rules* or *mechanisms* governing the transitions. The enumerated characteristics arise from limitations in intelligence that can be inferred therefrom, at least in part.

The subject matter of physics is, when judged according to exactitude, the most successful application of intelligence to reality. The characteristics involved in physics' success, turned inside-out, so to speak, suggest subject areas where intelligence should be least successful in its endeavors, based on characteristics that are contrary to those that mark the successes of physics. Accordingly, we expect failure where the phenomena are unique, densely connected internally and to other phenomena, rapidly changing, involving disparate kinds of interactions, difficult of measurement or analysis and significantly influenced by haphazard events. Historical upheavals and interpersonal conflicts partake of these qualities and are, in fact, poorly explained and breeding grounds of controversy.

One subject area that is in a middle ground is the behavior of markets such as the stock market. Stock values are numerical and undergo step-like transitions, but each is unique and they are densely interconnected and significantly influenced by haphazard events. Some long range trends can be identified (over time measured in decades, the average value of stocks rises at an annual rate estimated at 8-10%) but short term predictions have never been successful. For example, "hype-free" investment advisor Frank Armstrong III recommends that a prudent investor buy institutional-class index funds because he believes that stock market research is of little value. "The market and economic environment is far too complex to allow for accurate forecasting, even if we have perfect data and insight. At best we have a very poor understanding of how the economy and the world's markets work. Even worse, noneconomic events pop up randomly to confuse us even more. One well-placed bullet, typhoon, coup, drought, or earthquake can make shambles of the best forecast. As a result, earnings and interest rate forecasts are so laughably bad that anyone with a 40 percent success rate can qualify as an expert." *The Informed Investor* at 81.

Another subject area in a middle ground, where intelligence can be applied with some success

but where such application is fraught with difficulty, is “the law of the courts” or *juridical law*. Applying the same approach to juridical law as is applied to physics, as set forth above, civil actions (e.g., disputes over money or property) are analyzed into (1) *issues* for separate decision by a judge or jury. (2) In general, stable legal *rules and principles* guide the decisions. Rules and principles are designed to be (3) *context-free*, i.e., applicable to many different cases and regardless of (4) *irrelevant* facts or circumstances pertaining to the parties or of the case; and applied, as much as possible, to (5) *objective criteria*. Complex constellations of fact and legal doctrine are organized so they can be (6) *reduced* to simple judgments, e.g., an award of a number of dollars or an order of a court so clear and unambiguous that it can be mechanically enforced by the sheriff. These features of the legal system make complicated and acrimonious disputes more amenable to resolution by a human intelligence beset by limitations that nonetheless seeks to reach efficiently toward a final conclusion consonant with justice and social policy. The features of the legal system have been developed toward those ends.

In both analyses (physics and juridical law) the enumerated characteristics point toward limitations in the processes of intelligence. There are parallels in the systems used in physics and juridical law. In juridical law, the exercise of freedom is explicit and incorporated into a system that requires such exercise by judges and juries; while in physics, it is implicit in the activities of physicists and can be disregarded if one is concerned only with the products of the discipline. There are other differences too, including different views of the "concept of law," discussed below. The two systems thus shed light on one another, as well as providing a usefully bifurcated view of the subject matter.

The analysis supports the following principles. When directed at reality, intelligence is successful to the extent it is directed at *susceptible phenomena*, i.e., phenomena that is: (1) *stable*, i.e., phenomena susceptible of being viewed as unchanging, or, as a frequently used fallback, susceptible of being viewed as a connected succession of “states,” each unchanging for a duration, however short; (2) subject to *confirmation* by multiple faculties of intelligence (e.g., hand and eye) and/or through reports from other persons and/or by investigation approaching from different directions (e.g., lab tests and eye-witness testimony); (3) *explicable*, i.e., phenomena susceptible of being “made explicit,” isolated from surroundings, at least conceptually and viewed independently of those surroundings; and (4) *integrated into structures*, e.g., phenomena that can be organized without contradiction through features that can be *identified* (said to be the “same”) as or *differentiated* from features of other phenomena.

I argue that when intelligence is successfully directed at such susceptible phenomena, it constructs *objects* that and that objects can be incorporated into structures. I use the term “object” to include specific objects, e.g., material bodies; words and their meanings; mathematics, technical products such as computer programming modules (as in “object-oriented programming”); and laws (both physical and juridical). *The object concept* is discussed in depth in part II below. In brief, an object constitutes a coherent body of phenomena that can be isolated from an environment, that displays stable features when appearing in multiple environments and that appears to be the same for all persons. Analyzability makes an object more useful. For example, on Earth, most atomic nuclei satisfy these conditions. Meanings of words are, in general, imperfect but still highly useful objects, while words themselves and documents are clearly objective. Objects enable intelligence to *attach to* reality, and the

resulting attachments establish subject matters where intelligence successfully grasps or acts on reality. The degree of success depends on the degree to which the reality conforms to ideals “stable-confirmable-explicable-integrable.”

The object concept has wide-ranging application. One person’s promise, if reliable from the perspective of an other person, constitutes an object that such other person can use to structure his or her own reality. One person can similarly use the integrity of another person’s character as an object. The network of dependencies that can and does thereon arise is a foundation of society.

Objects make it possible for intelligence to structure reality and structures of analyzable objects can be developed through *relations* that enable us to describe reality and to modify reality to better suit our needs. *Attachments* are coordinated with *detachments* as intelligence moves through structures and modifies structures and the objects that make them up. We exercise freedom through attachments to susceptible aspects of reality and through development of structures of objects through which we move and which we progressively modify for greater efficacy.

That is, successful objects incorporate aspects of reality that are, at least approximately, stable, isolable, confirmable and susceptible of integration into large-scale structures. The production, use and development of such objects is what intelligence is all about.

There is an activity of *construction*, and, more specifically, *the construction of reality*. Reality is constructed, e.g., through conceptions in the mind, muscular activities, physical products of technology and words and symbols. In both physics and juridical law, intelligence is directed toward such construction. Useful examples are drawn from the two disciplines.

The involvement of freedom is based on the hypothesis that *reality is not inherently structured*, but is partially structurable through intelligence that selectively focuses on phenomena that can support objects and structures of objects. In other words, neither objects nor structures of objects are inherent in reality but are constructed through the activities of intelligence directed toward susceptible areas of reality. To be successful, objects and structures must be adapted to both the limitations of intelligence and the requirements of reality; and, to the extent possible, reality must be incorporated into the objects and structures.

There is, according to the hypothesis of unstructured reality, an inherent lack of fit or a “mismatch” between intelligence and reality, at least in some areas. Intelligence cannot comprehend reality and reality continually presents intelligence with phenomena that violate the integrity of structures. The mismatches and violations can, however, often be reduced or, for some phenomena, even eliminated, or nearly so. This task is typically never finished, and if it were to be finished, it would be abandoned as attention moved elsewhere. Adapting intelligence to reality and vice-versa requires activity that cannot be anticipated but must be accomplished *spontaneously*, i.e., “on the fly” in an “*ad hoc*” fashion, “here and now.” Such spontaneity is a feature of freedom discussed in § 2 above. The other features are similarly accounted for.

The hypothesis that we construct reality is not new. The title of this essay has been borrowed

from the translated title of a book by the pioneer of child developmental psychology, Jean Piaget, whose *The Child's Construction of Reality* (original title, *La construction du réel chez l'enfant*, 1937) followed closely on his *The Origins of Intelligence in Children* (*La naissance de l'intelligence chez l'enfant*, 1936), seminal works in his enormous *oeuvre*. The first chapter in *The Child's Construction of Reality* is titled "The Development of Object Concept" and the conclusion is titled "The Elaboration of the Universe." In more advanced works, Piaget and his collaborators presented models of relations and structures.

Although my views and terminology differ from those of Piaget in important ways (e.g., Piaget apparently believed that reality was inherently structured and he did not consider freedom), he is my most important influence. (Piaget's work has been properly criticized, e.g., in Sugarman, *Piaget's construction of the child's reality*. See also my critical appreciation of Piaget on the website.)

The hypothesis that reality is not inherently structured is resonant with views expressed by other writers at various times but is plainly contrary to the prevailing scientific view that reality is entirely structured, e.g., by laws of physics. I arrived at this hypothesis only after a lifetime of education and personal research that included an advanced degree in physics, legal training and a professional litigation practice plus extensive readings in philosophy and psychology. I have also had the opportunity closely to observe freedom being exercised by trial lawyers with whom I work. After examining these phenomena, I believe that the system of ideas stated in this paper and their application validate, at least partially, that hypothesis.

The hypothesis that reality is not inherently structured cannot be tested directly because we live within structures our intelligence has built and we cannot get out of such structures, at least in ordinary life or by intellectual activity. The hypothesis can, however, be supported by a theory of objects and structure (the "model") and by a critical approach directed at the products of intelligence (analysis of "incongruence" and "incongruities"). As presented below, the critical approach is used to examine the notion of "causality," which is analyzed into features that do not fit together, such as incongruent final causes (e.g., intentions) and efficient causes (e.g., mechanisms). ("Final causes" and "efficient causes" are terms introduced by Aristotle.) I argue that causality is not inherent in reality but is a relation generated by human intelligence that is often useful when directed at susceptible phenomena, but also often useless or nearly so. Even when directed successfully, its form is subject to variations that conflict with one other, displaying "incongruities" in detail and overall "incongruence." In my view, "free will" is an attempt to structure an exercise of freedom in terms of causality ("will" is the "cause" of voluntary actions) and is a concept fatally flawed.

The conclusion is that we exercise freedom when we construct objects and structures of objects. While we are so engaged, the objects and/or structures are unstable. Construction must be carried out spontaneously and in response to unstructured reality and structural changes are not always governed by stable principles. Because intelligence requires stable structures and stable principles for clear conceptualization, an exercise of freedom cannot be clearly conceptualized but can only be inferred from the nature of objects and changes in structures. Science and causality, at least as presently conceived, posit both stable objects and structures and also that changes in such objects and structures are governed by stable principles, e.g., mechanisms.

Hence, I conclude that an exercise of freedom is beyond the scope of science and causal structuration. There can, however, be an alternative *indirect* approach, such as is presented herein.

In the indirect approach, some exercises of freedom constitute objects. That is: phenomena of freedom can be isolated from the circumstances in which they appear and parallels drawn between cases; and some features of such phenomena are stable, subject to confirmation and integrable into large-scale structures. For example, in juridical law, jury verdicts and judicial decisions are exercises of freedom by juries and judges respectively.

A metaphor illustrates my approach. As clothing is to the human body, so our objects and structures are to reality. It is as if, metaphorically, we see the clothing a person wears but cannot see the unclothed body. (We see our objects and structures but not the reality they clothe.) Clothing both conceals and reveals the body. (Objects and structures both conceal and reveal reality.)

Some parts of the body, such as the back, are easily clothed. Other parts, such as that around the waist and thighs, require more complicated fitting. Although some features of the clothing may be universal, the fitting is approximate and depends on the particulars of the individual. Materials and design of clothing depend on the wearer's activities. With a growing child, fitting may be difficult because the body is changing, but the situation with objects and structures vis-a-vis reality is even more difficult because reality presents continual surprises.

A garment is patched together out of pieces, and seams are sometimes difficult to sew or maintain. A single overall covering would function poorly and different kinds of garments cover different areas (compare shoes with gloves and hats with shirts).

The human body came into existence prior to the invention of clothing. *The body is not inherently clothable.* (Reality is not inherently structurable.) For these reasons, designing and fitting clothing is an exercise of freedom. The nature of the body and human needs impose disciplines on clothing designers (a shirt should have two armholes or sleeves and the garment should last as long as possible) but many variations are possible; and ornament and elaboration are limited only by the inventiveness of the designer and judgments by the purchaser.

Moreover, "clothes make the man" and our objects and structures make what us the men and women we are. If we want to be well-clothed, we learn about different fabrics and how clothing is designed and fitted. If we want better objects and structures, we should examine how they are constructed. Because their construction requires an exercise of freedom, freedom is at the center of the inquiry.

§ 4. Accounting for freedom

An analytic approach to freedom is developed through three stages. Later stages employ greater speculation, justified by a deepening reach. The presentation overlaps that made in § 3, above, but from a different angle.

a. Structural incongruence

To begin the first stage, note that the subject task of § 2 ("verbal description of a visual image") involves two different human faculties, one visual and the other verbal, governed by *different structural systems*. Some contrasting aspects are stated below:

<u>Visual Image</u>	<u>Verbal Description</u>
The image is embedded in the perception of three-dimensional space.	The description is a one-dimensional string of words.
Each object is specific and concrete.	Words are generalized abstractions (e.g. common nouns).
Many visual objects display an inexhaustible richness of detail.	The description employs a relatively small number of words.

The two structural systems do not fit together in any clear or definite way. I use the word *incongruence* to describe such lack of fit, or, in common parlance, a "mismatch." Here, there is *structural incongruence*, analyzed into contrasting aspects of different structural systems. Incongruence is a collective term; and specific points of incongruence are called *incongruities*. The three contrasting structural aspects stated above, taken pairwise, are incongruities. The list of incongruities constitutes an *analysis of incongruence* that is of central importance here.

Structural incongruence in the task "verbal description of a visual image" as a whole does not mean that incongruence is present to the same extent in every part of the task. In my home office, for example, computer components, like the tower case, keyboard, mouse and monitor are separate items easily identified. Large file folders on one shelf even have labels attached that can be listed. Incongruence is, however, present in other visual objects, where writing a description would be very difficult, such as the camellia bushes outside the window or the wood grain on the top of the desk. Still other parts fall in between, e.g. a box filled with small office tools and supplies: the foregoing 9-word description is easily written but a detailed description that specified the arrangement of objects inside the box would be very difficult. I say that different aspects of the visual image have different *susceptibilities* of being described verbally. Differing susceptibilities can be roughly arranged in a *spectrum*.

For one particular object, the image on my computer monitor, it is possible to describe the visual image comprehensively, i.e. exactly and completely — because the computer has been so designed by engineers. In technical terms, the image displayed on my computer monitor is comprised of an array of "800 pixels by 600 pixels" and the color of each pixel is described by 24 bits of data. [The technicalities are not important.] There is an exact and complete

description of the image on my computer monitor at any given moment and that description is contained in a memory chip on a device in my computer. The device "reads" the description in the chip and "draws" the visual image on my computer monitor. There is a simple, determinate relationship between the description of the visual image in the chip and the image on the screen of the monitor.

The spectrum of susceptibilities accounts for some features of the exercise of freedom in the subject task of "verbal description of a visual image." The task can be accomplished most easily as to those matters where susceptibility is high and as to these efficacy is clear. Discipline can direct attention to those objects susceptible of description and development can lead to a progressive reach into areas of lesser susceptibility.

Structural incongruence also accounts for other features of freedom encountered in the subject task. Because of the mismatch, there is no automatic fit between words and image and no perfect description. Rather, in general, there are many possible imperfect descriptions, giving rise to indeterminacy and diversity. Resolving the incongruence is an ongoing affair and the choices made in writing the second sentence will depend on what has been said in the first: this gives rise to spontaneity. Development through a class of tasks is also spontaneous because the incongruence pervades the entire class of tasks and the progressively broadening reach is not fore-ordained, but dependent on disciplines developed at earlier stages.

Structural incongruence also illuminates the subjective phenomena involved in the task. Two incongruent structural systems must be *coordinated* in one's mind. They must be *balanced*; that is, each must be given an appropriate share of attention. Writing the description requires *shifting concentration* or focus that moves as one part of the task is completed and the next approached. There must be a sequence of *attachments and detachments* to and from parts of the visual image and the verbal description. Metaphorically, the two structural systems must dance with one another to serve the writer's purpose.

b. Epistemic Heterogeneity

A pivotal question is whether the structural incongruence discussed above can be resolved in a general way. One way to imagine that this result could be achieved would be to identify a single overarching structural system that comprehends both the visual structural system and the verbal structural system, that is, where the visual system is a special case of the overarching system and the verbal system is another special case. (For example, the overarching real number system using the notion of indefinite continuation, e.g., $\sqrt{2} = 1.141\dots$, comprehends both fractions (reduced to the lowest denominator) and square roots of natural numbers, even though square roots of natural number cannot be stated as fractions and fractions cannot be stated as square roots of natural numbers.)

In dealing with "verbal description of a visual image," one might suggest "neurons" for such an overarching system, but this suggestion ignores the established fact that neurons are highly diverse (even if interconnected) and that real brains incorporate different neuronal systems that

may be incongruent. (Interactions involving incongruent neuronal systems is, in my opinion, a key to understanding the functioning of brains.) I cannot conceive of an overarching structural system that comprehends both visual images and verbal descriptions. The structural incongruence and its analysis into incongruities appear to present insurmountable hurdles.

Our intelligence seeks: comprehension, incorporating all matters presented; integrity, with everything organized into a single system that has no contradictions; and correspondence to reality. In sum, to paraphrase a famous saying of Matthew Arnold, we want to see things clearly and to see them whole. So far we have not been able to satisfy all desires simultaneously. Comprehensive systems fail to achieve genuine correspondence to reality when measured against the brute facts of human existence. Integrated systems, such as physics aspires to be, fail to achieve comprehension; there are matters outside or beyond such systems.

In this essay, I hypothesize that, because of systematic limitations in our intelligence, *it is not possible* for us to achieve in one system comprehension, integrity and correspondence and that all human attempts at achieving these ideals simultaneously must necessarily fail. The history of human endeavors supports that hypothesis. I seek to account for that failure through my system of ideas. Accounting for that failure also accounts for freedom.

The second stage of accounting for freedom builds on the notion of incongruence. In general, I hypothesize that there is something like incongruence between experience and reality. That is, I hypothesize that experience and reality have different organizing principles (and that reality is so different from experience that the notion of an "organizing principle" as applied to reality is only a metaphor.) I use the term "*epistemic heterogeneity*" to denote this difference. "Epistemic" refers to the nature of knowledge. "Heterogeneity" denotes the differences between experience and reality.

Epistemic heterogeneity is different from the structural incongruence discussed above. Structural incongruence occurs *within* experience and involves incongruence between two different structures of experience. Epistemic heterogeneity involves experience and a reality that is assumed to be *outside* of experience. More: epistemic heterogeneity asserts that much of reality is *necessarily* outside of experience; in general, that the "true" nature of much of reality is *beyond* the reach of experience which can, in general, construct only approximations of it except at selected points and in selected regions. We know that structural incongruence exists because we experience it directly, but we can only hypothesize about epistemic heterogeneity.

Epistemic heterogeneity, if true, implies structural incongruence in a practical way. If reality cannot fully comprehend experience, then we can and do develop diverse forms that approximate reality in different ways. It is reasonable to suppose that brains have so developed through the evolution of animal life. In other words, I do not have a single "brain" but a congregation of brains that work together, sometimes well and sometimes poorly. Developing my brains (or my mind) for a more efficacious exercise of freedom involves skills in coordinating and balancing the different parts of the congregation that may have incongruent operations. Skills in shifting concentration and in carrying out attachments and detachments are also important. Hence, epistemic heterogeneity accounts for some of the subjective phenomena of freedom.

Consider, as a metaphor, plane maps of the Earth. Because the Earth is a three-dimensional object, closely approximated by a sphere, no plane map can represent it exactly. However, certain aspects of the representation can approach exactitude as the relative size of the plane map approaches zero. It is possible to construct a collection of highly localized maps that represent every area of the Earth and where representation approaches exactitude as closely as desired. The number of maps in the collection increases indefinitely as the error approaches zero. Other aspects of the sphere are not clearly represented by plane maps, such as the "curvature" of the Earth (using the term in its mathematical sense).

As to maps representing large areas of the Earth, there are a multitude of plane maps generated by different methods ("projections"). The outline of a country on a map based on one projection will not coincide exactly with the outline of the same country based on any other projection. There is "incongruence" between the two outlines. The incongruence between the two outlines is implied by the incongruence between plane maps and the three-dimensional Earth and the existence of different projections or different foci of projections. Similarly, I suggest, structural incongruence between different structural systems is implied by epistemic heterogeneity and different faculties of experience applied to objects being examined. The account of freedom provided above in connection with structural incongruence can then be carried over to epistemic heterogeneity.

c. A hypothesis about reality

The process of generalization has moved from structural incongruence to epistemic heterogeneity. As the final stage in the process of generalization, I hypothesize a particular characteristic of reality that seems to account for the phenomena of freedom and, in addition, to advance the inquiry. The hypothesis cannot be proved directly, of course, for, assuming epistemic heterogeneity, the nature of reality is outside experience. But its success in accounting for various phenomena and in advancing the inquiry supports belief in its truth. I call the hypothesis "the contrary hypothesis."

The contrary hypothesis is: ***reality is not inherently structured***. Rather, structures are constructions of intelligence. We see reality in terms of the structures we construct through our perceptions and through our actions. The structures we construct are successful because we focus on phenomena that are susceptible to structured interpretation and because we build, and live, both concretely and metaphorically, in structures created by our intelligence.

We ***project*** our structures onto reality. Projection has two aspects: we perceive structures in our images of reality and we shape reality to conform to structures we mentally construct. Taking the two aspects together, we structure reality. But reality will often surprise us by producing phenomena that are not comprehended by the structures we have constructed. Indeed, I hypothesize that there are parts of reality that defy structural representation: ***reality is no more than partially structurable***.

When the structures we create are successful, we have "pushed back" the contrary hypothesis and found a part of reality that can be structured. The history of progress in human endeavor,

including physics and juridical law, is the saga of such successes. The contrary hypothesis thus allows for partial retreats when intelligence succeeds: that is why it is contrary. We can conjecture that it might be possible that the contrary hypothesis could be forced into a complete retreat and even totally defeated and we could then conclude that reality *is* inherently structurable. However, the facts of life demonstrate that the contrary hypothesis, even though it retreats, is never totally defeated. For example, the structures of juridical law generate new problems. Advances in physics generate theoretical and mathematical complexities, including methods of approximation, that are never wholly efficacious.

There remains a residuum where we fail to structure reality. There is also a *margin* or *boundary area* (like the shore where ocean meets land) where our invented structures meet areas of unstructured reality and it is at this margin that we exercise freedom. A fancier statement is that we are *liminal* creatures, using the Latin word "limen" or threshold. We exercise freedom at the boundary between wild reality and our domesticated home.

From the perspective of the contrary hypothesis, all that we are able to construct in perception and concept is an *image of reality* that is, in general, no more than approximately true and that approximates reality only as to selected features. Because we can only see the image, it veils the true nature of reality. This state of affairs has been called "the veil of illusion," a phrase I shall adopt. Because of the diversity and fertility of human invention, there are many shapes and designs for a veil of illusion and, consequently, many different veils even if we believe that the underlying reality is fixed.

[The earliest statements of the veil of illusion are found in the teachings of Buddha and the *Upanishads*. Something similar was proposed in Plato's cave. More recently, Nietzsche asserted the same principles, e.g., in *Beyond Good and Evil*, §§ 4, 14 and 21. In contrast to these predecessors, I ***accept and embrace the veil despite its shortcomings*** as the best we can accomplish and as an instrument for the exercise of freedom.]

Even though the true nature of reality is covered by the veil of illusion, such a veil may be highly useful. There are susceptible parts of reality over which the veil can drape and conform so closely that, for all practical purposes, the veil not only conceals reality but also discloses it to a high degree of accuracy. (Like an article of clothing, the veil of illusion may even enhance appeal — by, e.g., ornamental colors.) Some susceptible parts of reality are approximated by intelligence using scientific methods and science focuses on precisely those parts of reality where conformity is most nearly exact. Juridical law is backed up by power (the sheriff with his writs and guns) that compels reality to conform to its mandates. In all cases, the structures are built through an exercise of freedom and then must be taught and learned.

Because the true nature of reality can only be approximated and because the approximating forms are constructed, different approximated forms may result in different degrees of approximation, under different circumstances, generating indeterminacy and diversity. The different approximating forms impose their disciplines on the endeavor and, conversely, the disciplines define the approximating forms — the disciplines are essential to efficacious action. Because of the essential "mismatch" between experience and reality, approximation must be accomplished bit by bit, and no pre-arranged program will be ideally efficacious — hence

spontaneity is required. Skills in "fitting" the veil can be learned, leading to development. There must be a target of approximation and/or development, which is purpose, and the individual, unable to adhere automatically to the constraints of reality, must strive to do so. Different structures must be coordinated and balanced and one using them must concentrate and continually attach to and detach from aspects of reality to adjust the fit of the structures to a reality that is inherently unstructured. Accordingly, this approach accounts for the features of freedom described in § 2 above.