CHAPTER 3

INTENTIONALITY AND SCIENCE

3.1 Introduction

Basically, *Intentionality and Science* purports to examine Dennett's postulation of intentional stance vis-à-vis science. The beginning section sets the stage by briefly recapitulating Dennett's intentional stance theory. Subsequently, we take a detour of the early theoretical development of atomic theory before using them in arguments. The aim of the chapter is straightforward, it is to see how well Dennett's theory of intentional stance aligns with science. If anything, this is a test of Dennett's intentional theory vis-à-vis science, as science is also a crucial standpoint in Dennett's inquiry.

3.2 The Intentional Stance Theory

Amongst Dennett's novel contributions to the study of mind, the physical, design and intentional stances stand out as the most important. It is evidently the cornerstone to Dennett's philosophical *Weltanschauung*. Even his thoughts on consciousness stand or fall with his views on content, for he indubitably claims to rest consciousness on a well founded theory of content. As Dennett often claims, "for years I have been proceeding on the plan that the best way to make progress is to divide and conquer thus: first a theory of content (intentionality) and then (*on its shoulders*) a theory of consciousness" (Dennett 1988c: 540, emphasis added). Content is hence the unmistakable standpoint with which to begin our work on Dennett.

Science, as Dennett himself argues, is one of evolution's crowning achievements (DDI 378-380) – by far the best and most impressive triumph of nature (natural selection).[1] More than Popperian creatures empowered with abilities to take on environmental inputs, to be 'reflected' upon before translating into behaviors, the Gregorian creatures (notably humans and presumably also the higher primates in some rudimentary ways) have moved one step further up the plausible design space of evolution. Over and above their abilities to allow 'hypotheses to die in the stead,' Gregorian creatures have discovered ways to manipulate and subdue nature. In other words, to design and redesign nature, even themselves, through genetic engineering, for instance.

Essentially, the Darwinian, Skinnerian, Popperian and the Gregorian creatures all work within similar generate-and-test principle of natural selection, albeit varied in plasticity, hence differ in inherent potential for innovations. It is this virtue in plasticity and the immeasurable latent power of innovation most significantly found in the Gregorian design space that contributes mainly to rapid increase in

[1] As Dennett puts it, it ought "to be obvious that the methods and rules of science – not just its microscopes and telescopes and computers – are the new *sense* organs of our species, enabling us to answer questions, solve mysteries, and anticipate the future in ways no earlier human

human's mastery of nature. As Dennett himself notes, with *science* the Gregorian creatures are able to compress million years of tinkering and experimenting of nature into the work of one single generation (DDI 381).

If there is one single explanation that accounts for the predominance of science and the corresponding demise of the folklore's alternative in understanding and mastery of nature (e.g., astrology and alchemy, amongst others), predictive leverage arguably comes closest. Cognizant of its importance, Dennett is most probably taking cue from its success (especially its predictive power) in his formulation of the theory of intentional system.[2] As seen in last chapter, in spite of the evanescent property of intentionality, Dennett still chooses to accord great significance to intentional stance (his theory of content), owing largely to the voluminous predictive leverage of folk psychology.

Its importance is evident via the trio manifestations of predictions by means of the physical, design and intentional stance in Dennett's principal exposition of content. *Prima facie*, these stances appear different, but they are in fact interdependent. Physical stance provides the minutest detail of the inner workings of a Notebook (for example), which gives anyone interested in the mechanism of

---

institutions can approach. The more we learn about what we are, the more options we will discern about what to try to become" (Dennett 1999f: 2, emphasis added).

[2] Says Dennett, "I have long maintained that ignoring the relevant science is the kiss of death in philosophy of mind, no project could be dearer to heart than showing how paying attention to such non-traditional details is the key to progress" (GR 505; see also Dennett and Hofstader 1981: 460). "No Wonder tissue allowed. I will try to explain every puzzling feature of human consciousness within the framework of contemporary physical science; at no point will I make an appeal to inexplicable or unknown forces, substances, or organic powers. In other words, I intend to see

computer a robust and comprehensive predictive framework. Meanwhile, design stance abstracts away the whole of most physical workings of the computer, making predictions entirely at the abstract level of design. For instance, when I execute X to instruct the computer to perform a function Y, the computer may have to undergo say fifty intermediate steps or processes (say from A_1 A_2 A_3……..A_{50}) before Y is performed. Prediction of Y from X by physical stance would entail taking detours from A_1 to A_{50}. Design stance, however, makes identical prediction through simpler means: namely design, Y is performed when X is executed precisely because X is designed to execute Y.

Design stance is, however, a subset of the physical stance because design blueprint crucially depends on the expediency of physical know-how, without which a design would not work, not to mention making meaningful predictions. So, design presupposes the existence of a physical backdrop on which it is founded. Though design (stance) is used as convenient shorthand to serve practical ends, technically speaking, it is not possible to have a design stance without its physical analogue. One simply could not design anything out of nothing.[3]

Intentional stance represents even higher level of abstraction. Though less reliable and riskier (KM 31), its significance is realized through predictive lever it yields

what can be done within the conservative limits of standard science, saving a call for a revolution in materialism as a last resort" (CE 40; see also Dennett 1981a: 103).

vis-à-vis *complex* prediction processes. Apart from that, as shown earlier in Chapter 2, Dennett argues strongly for the importance of intentional stance (besides inheriting predictive virtues from folk psychology) in playing crucial theoretical role, serving as competence model, for the characterization of a performance model, thus reinforcing the *primacy* of physical stance.[4]

Hence, though prediction is conceptualized in terms of stances, one is wrong to conclude thus that the design and intentional stance thereby assume self-sufficient existence (independent of its physical analogue). As argued, design is a limiting case of the more basic physical stance. Analogously, besides *not* carrying ontological weight, intentional stance derives its fruitfulness from complexity in physical and design prediction it capitalizes therein. In fact, Dennett (KM 30, IS 73, Dennett 1988b: 498) points out repeatedly that intentional stance is to be viewed as a particular instance of design stance. Clearly then, design and intentional stance are the *abstract* consequences of physical stance - a proxy less reliable, though swifter, riskier, and hence less comprehensive as far as prediction is concerned.

[3] Ruling out omniscience God whom in principle could create anything out of nothing. But even here if one assumes human as one of God's creation - one of God's masterful design - still one does not suppose that humans are thereby above physical laws.
[4] "Our departure point is the mind, meaning roughly the set of phenomena characterized in the everyday terms of 'folk psychology' as *thinking* about this and that, having *belief* about this and that, *perceiving* this and that, and so forth. Our destination is the brain, meaning roughly the set of cerebral phenomena characterized in the *nonintentional,* nonsymbolic, non-information theoretic terms of neuroanatomy and neurophysiology" (BC 216, emphasis added). "What we want in the end, is a materialist theory of the mind as the brain" (BC 216) and "I have always been a realist about sub-personal intentional psychology" (cf. Bechtel 1985: 482n5; see also IS 56-57, 70-71).

3.3 Stability of the Stances

Dennett's aim of seeing prediction in terms of stances is clear. As alluded to in Chapter 2, besides serving to bridge mentality into the material, thus freeing one from having to worry about its ontological scruples, it serves further to legitimize its use as specs for the later instantiation of a physical (subpersonal) model. Therefore, given the way intentional system theory is formulated, physical stance is undoubtedly the *core* with which the rest of its lesser analogues revolve. It anchors, in the main, intentional and design stance.[5]

Admittedly, characterization of prediction in terms of stances is attractive and *prima facie* plausible. Proven true, one would have discovered a means of accommodating intentional idioms without worrying about thorny ontological issues arising therefrom. In other words, it allows one to savor all the benefits intentionality grants, yet avoids its accompanying hazards (by conferring it with defeasible philosophical existence). That is, on Dennett's tactical reformulations of intentionality, one enjoys the best of both worlds. One continues using mental idioms (legitimized through intentional stance), as and when it is useful and strategic, without being plagued by its costly repercussions (heavy costs/prices), since adoption of the stance is for free (IS 24).[6] But how free could that be? Next, let's concentrate on examples from science that hopefully help throw lights on

[5]Though Dennett has not explicitly asserted this, given his strong allegiance to third person approach to the mind, and the subservient way he perceives intentional states, this is naturally the inescapable upshot of his theory.

Dennett's treatment of intentionality by means of stances. Further to this, also relevant is the question of the *prevalence* of physical over intentional stance.[7]

3.4 Whither Intentional Stance?

3.4.1 Rutherford's Atomic Model[8]

What is matter? Men's quest to understand the nature of matter dates back at least to the time of the Greek (Democritus and Leucippus) when it was postulated that matter is made of indivisible atoms. After coming a long way in our incessant search for the ultimate building blocks of the universe, the very same question is still asked today. The discovery of X-rays, radioactivity and electrons ushered in the beginning of what was to become the most rewarding and proliferate particle hunt in the history of mankind. In fact, the period between the very end of the 19th century and the next thirty years or so witnessed dramatic discoveries and revolutions in physics that were to change in profound ways the way we view the world, especially the exotic world of the subatomic.[9]

---

[6] It is true Dennett says that "the facts about the success or failure of the stance, were one to adopt it, are perfectly objective" (IS 24). But given the indeterminacy of interpretations, it is not clear how this is ultimately to be attained.

[7] The predominance of the physical stance argued here is different from Millikan's supposition of the prevalence of design stance (Millikan 2000), which Dennett subsequently concurs in the context she defends it (Dennett 2000a: 341). The concern here is the employment of physicality as basis to ground questions concerning mind, whilst Millikan concerns seeing design in teleological terms to ground content (Millikan 2000: 57; see also p. 55).

[8] See Asminov (1974), Close (1983), Close *et al.* (1987), Coughlan and Dodd (1991), Crease and Mann (1986), Weingberg (1993), Ne'eman and Yoram (1996).

[9] We now know that atoms are neither indivisible nor the most elementary. Besides the three familiar constituents of atoms - the protons, neutrons and the electrons - many hundreds other subatomic particles have been discovered. However, till the 1890s, though it was essentially established that atoms exist, the age-old belief in the immutability of atoms as fundamental

In the early years of 1900, Rutherford and his team sent a beam of alpha particle harvested from radioactive materials, targeting them at thin metal foils. By painstaking registrations of the scintillation of fluorescent screen, they studied in detail the scattering angle of particles upon hitting the metal foil. Some of alpha particles were found to go straight through the foil, whilst others were deflected from their original path. Most amazingly, some of them actually recoiled and turned straight back.[10]

---

building block of nature held sway. It was not until the ingenious experiment carried out by Thomson in the 1897 that settled the aged old controversy concerning the nature of cathode ray: whether they are some form of wave or particle with definite mass. Thomson demonstrated, by maneuvering the beam through electric and magnetic field, that the ray was not wave but stream of negatively charged particles (in what is today known as electrons) with definite mass that is much lighter than the lightest atom known. With this experiment, the first subatomic particle was discovered, and segment of the mysterious internal structure of the atom was revealed for the first time. Stimulated by the discovery of X-ray, scientists became earnest to study the new phenomena. And this led to the accidental discovery of radioactivity by Becquerel in 1896. In contrast to X-ray which is a secondary radiation that result from collision of electrons with external objects, radioactivity results from self-radiation of uranium salt. Further discoveries and findings on radioactivity were extended through the work of scientists like Marie and Pierre Curie. But it was Rutherford who found that the radiation was made of beta and alpha rays. At this time, there were speculations as to what the structure of atom must be like, with manifestly different ways of putting together the positive and negative charges. One that stood out was Thomson's plum pudding model. Based on Thomson's discovery of electron, it was postulated that atom is a homogeneously dense mass with positive charges spreading out uniformly within atom, with electrons embedded in it, like seeds in watermelon. (Atom is known to be neutral, and since the negatively charged electron is known to be part of the atom through Thomson's discovery, hence it seems reasonable to postulate positively charged component in the atom that acts to neutralize its negatively charged counterpart.) If atom is neither the most elementary nor indivisible structure of matter, by which electrons, as Thomson established earlier, could break away from, then what does the structure of atom look like? How is the density of mass in atom being distributed? How do we know? Rutherford took advantage of his work in radioactivity, ingeniously employing research on penetration of radiation through matter as subatomic projectile to probe inner structure of atoms (though he was at this time still unable to fully comprehend the nature of radiation himself). This in fact still remains the main method employed to study the structure of subatomic particles today (through violent collision of particles beam on a fixed target or through head on collisions of high energy beam of particles). This method of probing by smashing atoms with high energy particles is in fact the precursor to the development of the ever increasing mammoth and sophisticated particle accelerator today.

[10] The scattering of particles from the foil does not fit well with plum-pudding model. For, if the density of mass and the positive charges are uniformly distributed in the atom, based on calculation, one should not expect any large angle scattering to occur. The positive charges were expected to cause some scattering of the particles, but due to the randomness of encounter, even cumulative deflection through the atoms is not expected, on this model, to yield large deflection

Equipped with results of this scattering experiment, Rutherford was able to propose an atomic model that remains generally valid to this day. Rutherford thought that backward scattering must be the result of a single collision. But alpha particle is massive and energetic, hence collision with a single positively charged particle (the way it is conceived in the plum-pudding model) would knock it slightly off its path causing at most small scattering, but the repulsive impact is not likely to cause large backward scattering. For the strongest electrical and magnetic forces then known could hardly bend the path of an alpha particle. So what could actually cause the large scattering observed?

Rutherford realized after some calculations that large-angle scattering could be explained if great portion of the mass is concentrated in a tiny positively charged nucleus, hence giving it electrical repulsive forces great enough to cause a recoil on collision or causing significant deflection to any particles come close enough to the nucleus whilst allowing the rest of alpha particles to pass straight through as if the volume of the atom is largely made up of empty space.[11] He knew the energy of the incoming alpha particles and the double positive charges they carried. Knowing that similar charged particles repel, he expected progression of alpha particle to be arrested, deflected and scattered backward on encountering its positively charged counterpart. Based on calculations, he came to the conclusion

---

seen in experiment. On the plum-pudding model, if some of the particles went straight through, albeit some with deflected angle, one would expect all to go through. Though most particles went through the foil with small deflection, the large angle scattering observed in experiment could not be accounted for by Thomson's model.

that on some instances, some alpha particles could actually come close to within one ten thousandth of the atom radius before being bounced back, hence suggesting that positive charges are concentrated in the compact miniature core of the atom. Prediction of scattering relative to the speed of alpha particles, thickness of metal foil and scattering angle based on this newly constructed model was later verified by experiment and hence having its validity confirmed.

3.4.2 Particle Physics and Intentionality

Dennett has not overtly touched upon the role of intentionality in relation to physical stance. However, science as known, is empirical, founded mainly on perception of the senses (especially visual) (CE 55-56). Without perception, there is certainly no physical stance from which to predict anything.[12] Needless to say, perceptions as ordinarily apprehended, are necessarily intentional. They are mental states that represent[13] on account of its property of aboutness (directedness) (KM 36-37).[14] Lets explore this more closely.

---

[11] And indeed it is. For the size of the nucleus is 100,000 times smaller than the whole atom. So, atom is largely made of empty space.

[12] As Einstein observed, "experience is the alpha and omega of all our knowledge of reality." "Pure logical thinking cannot yield us any knowledge of the empirical world; all knowledge of reality starts from experience and ends in it" (Einstein 1954a: 271).

[13] The intentionality of perceptions somehow 'bridge' or 'direct' or 'allude' the subject to the contents of the objects perceived by means of representation (i.e., by being about or concern with the object perceived). It is this aboutness of perception that defines its nature. In Dennett's own words, "[i]t is tempting to generalize and say that all things that exhibit intentionality are representations of one sort or another, but since we do not yet have an independent account of representation, this really means nothing more than that all things that exhibit intentionality are about ('represent') something" (Dennett 1990b: 52). In fact, according to Dennett, there must exist some strong relation between intentionality (or aboutness) of perceptual states and the object perceived before it could be identified or even recognized (CE 334). And no less important, this "aboutness can be (and perhaps must be) captured in terms of propositions, or intensions –

Discovery of electrons discussed earlier was initially prompted by the beautiful glows observed when electricity flow through low-pressure gas by casting shadows or luminous spot at the other end of the cathode - depending on the way these rays are made to manifest – so that their presence are made visible to our senses and hence susceptible for further scientific investigations. Subsequent accidental discovery of X-ray and radioactivity are associated with the glow of chemical coated paper upon stricken by X-ray and images formed by uranium radiation on Becquerel's photographic plate. Even confirmation of Rutherford's atomic model through the scattering experiment is only possible because Geiger and Marsden were able to count scintillation on chemical coated screen through a

---

sometimes called concepts" (Dennett 2001g: 133), which plays important role in Dennett's theorizing (as we shall see in Chapter 8).

[14] Dennett, for instance, agrees with Fodor's remark that "according to commonsense its representation that you need to explain intentionality" (FDDI 268). However, Dennett then goes on to take the issue further, "the tale of the chap who said the Earth rested on the back of a turtle, which rested on the back of yet another turtle, I would add: representation is what is needed to explain intentionality, but not representation all the way down. My theory of intentionality explains the aboutness of representations...but you have to give up original intentionality and see that all the late, robust, representation-wielding varieties of intentionality....are artifacts and hence have derived intentionality" (FDDI 268). "[T]he fact that there was no representation in the activities of Mother Nature was precisely the feature that made it possible to 'reduce' our intentionality in an explanatory way to something mindless. If Mother Nature had a mind like ours, full of representations, she would be like the worst sort of homunculus, merely postponing any explanation of intentionality" (FDDI 266). A detail analysis of the argument would take us beyond the purpose at hand. At this point, suffice it to note that it is not clear how Dennnet's account could work to stop this regression problem. Rey's perceptive remark is illuminating. "[J]ust as 'there wouldn't be colors at all if there weren't observers with color vision,' so then would there be no intentional systems without (other) intentional systems?....In any case, how are we even to specify the relational predicate 'x believes p relative to intentional system y relative to intentional system z relative to.....' Indeed, it would appear that ...such analyses of intentionality would run the risk of presupposing in the analysis the very intentionality being analyzed" (Rey 1994: 282n7; see also Vallicela 1991: 84-86, Kim 1996: 190, Morris 1991: 19, Seager 2000). What he is saying is that we need someone with intentionality <A> to attribute intentionality, but this <A> in order to be intentional system would need others to attribute it with intentionality, and so on, *ad infinitum*. We would see more on the notion of derived (and original) intentionality in Chapter 4, but something like the foregoing forms the basis in which this chapter is constructed.

microscope. Coated screen would scintillate with microscopic glows after being hit by alpha particles and thus enabled the researcher to register them.

Most subatomic particles are, however, so microscopic they are largely invisible to naked eyes. The only way to know anything about these evanescent beasts is via the study of tracks left behind through interactions with other substances. To this end, particle physicists devise various kinds of detector.[15] Most of them detect the presence of particles by formation of ions through interactions with intermediary substance (or agent), leaving behind trails that give away their presence (and hence identity), by way of condensation of water vapor, increase of electrical conductivity, formation of bubbles in superheated liquids and so on. Perceiving these particles, regardless of subtlety, is, however, only the beginning. Nevertheless, the key importance of perception in these instances is clear affirmation of the *primacy* of intentionality in yielding raw scientific inputs. Needless to say, the centrality of intentionality does not end with perceptions, for science does not build on perceptions alone.[16] Contrarily, its true power lies in the resulting outgrowth of theoretical formulations by means of logical inferences, hypothesis formations and experimentation, among others.[17]

---

[15] Ranging from primitive electroscope, to the scintillation counter, the subsequent cloud and bubble chambers, the Cerenkov counters, spark chambers and other more recent electronic chambers.

[16] Though as Feynmann reminds us, "observation is the judge of whether something is so or not. All other aspects and characteristics of science can be understood directly when we understand that observation is the *ultimate* and *final judge* of the truth of an idea" (Feynmann 1998: 15, emphasis added).

[17] As Selleri notes: "[i]t is from experimental grounds that scientific knowledge mostly arises, and this is a statement on which all physicists agree. Another point of agreement is that, if one is given a logically correct reasoning, then the only remaining debate can be around the correctness of the postulated premises or about the importance of the consequences. Experiments and logic are

At the risk of sounding banal, following this, Thomson *proved* that cathode ray was some sort of particle (electron), because through measurements and calculations of ray parameters in electric and magnetic field, he was able to *derive*, albeit indirectly, the mass of the ray. As only particles could have mass, it was hence *concluded* that the ray was indeed particle with negative charges. Thomson then went on to *hypothesize* that electrons must be imbued in the sea of positively charged particles akin to the plum in a pudding. He *knew* atom was neutral and through experiments, he was able to strip off electrons from matter, hence *believed* that atoms in matter must also consist of positively charged particles that neutralized the negatively charged particles in atoms.

If Thomson's model was correct, as Rutherford initially *thought* it was, it was *expected* that alpha particles he bombarded would have sliced through the foil with slight scattering, i.e., one would *predict* that average deflection of particle would not be more than $.005^0$, and that only about .01 % of the particles should be found with scattering exceeding 3^0. The probability of large scattering exceeding 90^0 *ought* to be one in 10^{3500}. However, Marsden's large angle scattering experiment *disproved* the model for it was *observed* that one in 10^4 actually scattered backward, much too common than was *expected* if Thomson model was true. It was also *astonishing* and entirely *unexpected* since most alpha particles sliced through the atom, there was something else obstructing it and actually

therefore the pillars on which the unity of physics is supported. This is the minimal methodological apparatus that everybody accepts" (Selleri 1990: 323).

scatter it backward. *Knowing* that alpha particle was heavy and going at high speed, Rutherford *reasoned* that large angle scattering must be due to near or head-on encounter with something massive in the atom. This *led* Rutherford to *believe* (or to be *convinced*) that the bulk of mass is densely concentrated in tiny nucleus providing it with necessary force to *explain* the large angle scatterings.

3.5 Intentionality and Science

On account of the above, if perceptions obtained in experiments are without exception intentional, in like manner, mental properties employed for conceptualization in science are also invariably imbued in the language of intentionality.[18] Consider belief,[19] which is without doubt vital component, basic to any scientific inquiry.[20] Essentially, science is a congregation of belief in existing truths engendering belief in other extended truths. Without beliefs, it is inconceivable how talks about hypothesis, premise, axioms, theories and even facts are intelligible. Besides, there is indivisible kinship between belief and

---

[18]Those italicized in preceding paragraphs. Note also, for instance, hypotheses, as Dennett - concurring with Popper - maintains are "events or states endowed with…intentional characterization" (BS 80).

[19]"What are beliefs? Very roughly, folk psychology has it that beliefs are information-bearing states of people that arise from perceptions and that, together with appropriately related desires lead to intelligent action. That much is relatively uncontroversial" (IS 46). "Exposure to X, that is, sensory confrontation with X over some suitable period of time, is the normally sufficient condition for knowledge (or having true beliefs) about X" (IS 18; see also FFP 2). "This causal chain… mimics the causal chain for reporting ordinary external events. You first observe the event with the help of your sense organs, producing in you a belief, and then a thought, which you express in your report" (CE 314-315).

[20] For, as Dennett asserts, "one cannot have a world view of any sort without having beliefs, and one could not have beliefs without having intentions" (BS 253).

truth.[21] Under normal conditions, it is quite unthinkable to know something true yet disbelieved. Likewise, it is almost preposterous to choose to believe something, knowing fully well it is false, for "[i]n general, normally, more often than not, if x believes p, p is true" (BS 18). Hence, when one proclaims something true, this is almost synonymous as saying one believes it.[22] Evidently thus, if science aims to discover truth, belief is key to its individuation.[23]

However, with respect to the crux of belief, Dennett maintains that "one cannot directly and simply cause or implant a belief, for a belief is essentially something that has been endorsed by the agent on the basis of its conformity with the rest of his beliefs" (BS 252). This auxiliary formulation of belief, however, invites problem for it does not seem to go along well with his theory of content generally. As Baker notes, though

> endorsement by the agent is eminently plausible as a requirement of belief and is necessary in many contexts of ethical evaluation, it goes well beyond the view that belief is what is predictively attributable. Since what is predictively attributable to an individual need not coincide with what that individual *endorses*, Dennett is not entitled to this claim (Baker 1987: 155, emphasis added).

This points to the general difficulty plaguing Dennett's intentional stance theory at large. Surely, a great part of what was discussed earlier are *insipid* facts. There

---

[21] "[O]ne part of the environment that matters to us is our belief environment. And since we are not easily gulled into continuing to believe propositions after the support of them evaporated, it matters to us that the belief be true, even when we won't ourselves see any direct evidence of them" (CE 452).

[22] We observe Dennett himself, in various places, argues we are in fact, true believers (BS 17-18, IS 18-19, 96; Dennett 2002a: 13). As Dennett also points out, "truth and consistency are norms of belief" (BS 282).

[23] To do science, one depends not only on overt beliefs (e.g., theories, thesis etc.), but rely inevitably on a whole strand of tacit beliefs usually taken for granted (see, for instance, BS 45, DC 217).

is nothing really distinctive (or novel) about them. But their exposition is nonetheless relevant given Dennett's irrealism of content, as we shall see later.

As pointed out, Dennett's denigrate views of content owes largely to the primacy he bestows predictive functions and behavioral patterns in his ascription of intentionality. Dennett observes thus:

> one can only ascribe content to a neural event, state or structure when it is link in a demonstrably appropriate chain between the afferent and the efferent. The content one ascribes to an event, state or structure is not, then, an extra feature that one discovers in it, a feature which, along with its other, extensionally characterized features, allows one to make predictions. Rather, the relation between intentional descriptions of events, states or structures and extensional descriptions of them is one of further interpretation. If we relegate vitalist and interactionist hypotheses to the limbo of last, desperate resorts, and proceed on the assumption that human and animal behavioral control systems are only very complicated denizens of the physical universe, it follows that the events within them, characterized extensionally in terms of physics or physiology, should be susceptible to explanation and prediction *without any recourse to content, meaning, or intentionality* (Dennett 1969: 78, emphasis added).

That apart, it is also pertinent to note the followings.

> If we individuate states (beliefs, states of consciousness, states of communicative intentions, etc) by their content – which is the standard means of individuation in folk psychology – we end up having to postulate differences that are systematically undiscoverable by any means, *from the inside or the outside*....We replace the division into discrete contentful states – beliefs, meta-beliefs, and so forth – with a process that serves, over time, to ensure a good fit between an entity's internal information bearing events and the entity's capacity to express the information in those events in speech. That is what the higher-order states were supposed (by Otto) to ensure, but they failed to *carve nature at its joints*. Indeed, they posited joints that were systematically indiscernible in nature (CE 319, emphasis added).

Hence, the

> ideal picture, then, is of content being ascribed to structures, events and states in the brain on the basis of a determination of origins in stimulation and eventual *appropriate behavioral effects*, such ascription being essentially a *heuristic overlay* on the extensional theory rather that intervening variables of the theory (Dennett 1969: 80, emphasis added).

What stand out from these excerpts is the practicality and tactical *raison detre* that underpins the construal of intentionality (see also *especially* complementary discussions in Chapter 2, as issues raised thereof are not rehearsed here). In like manner, Dennett crisply notes, "what makes it true that people have the real mental states is facts about their *behavioral* dispositions and capacities, but these facts can be perspicuously and efficiently expressed only from the intentional stance, an *instrument* of prediction (and explanation)" (MNM 923, emphasis added). On account of the above, it is dubious how Dennett's theory of content is to individuate scientific statements (delineated earlier on particle physics). As it is, the putative presence of intentionality in its individuation appears to run counter to Dennett's portrayal of content as "instrument of prediction."[24]

As observed, in the realm of atomic and subatomic, we rely exclusively on logical reasoning (and thus scientific and inferential content) to know anything at all about these imperceptible beasts (see also Dennett 2000f: 468).[25] No one sees them, yet we know they exist and discover ways to manipulate them. There lies the power of science. We gain information about our physical surroundings mostly through the scattering (or reflection) of lights from physical objects. However, Rutherford did not stop with observations (owing to scattering experiments), he went further to infer internal structure of atoms based on limited secondary information he had. By similar means, we deduce the ephemeral presence of a host of particles, for example through curved trajectories of tracks in

[24] Without question, belief is pivotal to prediction in science. But employment of belief on this account is different from its employment in intentional stance. Its legitimate presence in science is not dependent on its success as instrument in the postulation and prediction of the behavior of any intentional system (as seen from intentional stance). Conversely, belief and other mental properties are requisite and axiomatic (and self-justifying) as far as individuation of scientific content is concerned.

[25] Again as Feynman underscores, "[t]rying to understand the way nature works involves a most terrible test of human *reasoning* ability. It involves subtle trickery, beautiful tightropes of logic on

magnetic field, one infers the charge and momentum of particles. Its paths also reveal valuable information concerning mass, energy and lifetime one deduced via photographic films from detectors. These apart, neutral particles leave no tracks, but it is possible to infer their presence by analyzing decay products that leave tracks or through their interactions with other particles. The power of inferences is not limited by indirect deduction of perceptible tracks. Many important scientific discoveries are achieved largely through inferences that are not directly rooted in perception. In fact, true power of inferences lie in its ability to reach beyond the realm of the purely visible. Neutron was first postulated by Rutherford in 1920 to account for the discrepancies (e.g., the conservation of angular momentum, among others) that the proton-electron model failed to explicate. And its existence was confirmed by Chadwick in 1932. So is Dirac's deservedly groundbreaking discovery of antiparticles. Similarly, the existence of the elusive neutrino was first surmised by Pauli and Fermi in the 1930s to account for the asymmetry in energy, spin and momentum in the beta decay.[26]

Clearly, scientific statements are emphatically part of mental content. But if Dennett's theory is to be taken seriously, forcing the issue, arguments concerning their existence (as part of mental content) *ought* to be reduced ultimately to questions of *ascription* in accordance with how well it serves as heuristic overlay in predicting behavioral patterns (of intentional system). However, as witnessed

---

which one has to walk in order not to make a mistake in predicting what will happen" (Feynmann 1998: 15, emphasis added).

[26]Conceptualization of Einstein's relativity theories as well as quantum mechanics at large (be it Schrodinger's or Heisenberg's formulations) are other good cases in point.

above, the hallmark of science lies in predictive efficacy not in any way concerned with identification of its *explanandum* as intentional system of any kinds. Specifically, the superiority of predictive edge lies in its capability to discover or derive new facts in virtue of scientific reasoning. Prediction is regarded here an end that appears to be sufficient unto itself, not as means for the eventual postulation of intentional system (nor to justify the postulation of mental properties). This disjunction inevitably results in unbridgeable cleavage in Dennett's portrayal of content. On one account, according to intentional stance, mental content is heuristic overlay. Meanwhile, at the other end of the spectrum, content borne of scientific formulations individuate reality by means of physical stance. But how could this be?

Originally, to avoid its hazardous repercussions, Dennett bestows intentionality with periphery existence, whilst boisterously assenting to the reality of science.[27] This is mirrored in the latent prevalence of the physical over the intentional in Dennett's intentional system theory (pointed out in earlier part of the chapter).[28]

[27]Accordingly, Dennett claims that "I'm prepared to take my chances with conservative, standard scientific ontology and epistemenology" (DC 205). Physical stance would yield good theoretical *illata*, where real and concrete reality is discovered as against the theoretic fictional world of intentional stance. His dichotomy of the *illata* and *abstracta* points to the presence of "the furniture of the physical world" (IS 72) that carves nature at real joints (BC 105). So, for instance, we see Dennett in concurring with Bechtel (1985), notes that *realism* would be vindicated if there is a mapping of the intentional idiom into its physical underpinnings (IS 76n1; see also IS 70-71), as Dennett claims that he is a realist about the subpersonal psychology (Bechtel 1985: 482n5; IS 56-57, 63, 70-71). He further asserts that "[t]here is always more to learn about things we are realists about: electricity or electrons, DNA molecules or chromosome" (Dennett 1988c: 537). And more pointedly, "I agree wholeheartedly with this, and am, indeed, as scientific a realist as one could find" (DC 210, 212; see also DDI 75). This clearly points to his underlying realist commitment to the presence of a physical world.

[28]What ultimately concerns Dennett is the subpersonal characterization, as he succinctly observes: "cognitive theories are or should be theories of the subpersonal level, where beliefs and desires disappear, to be replaced with representation of other sorts on other topics" (BS 105).

But as observed, scientific statements are emphatically a manifestation of mental content. One way or the other, intentionality is invariably implicated in establishing the physical stance. Hence, the role of intentionality is vital, its engagement is nontrivial and even pivotal in this regard. However, if according to Dennett, intentional stance is *the* theory of mental content,[29] how then is this exclusionary treatment of scientific statements justified? Dennett cannot have the cake and eat it. To maintain realism of physical stance, whilst renouncing ontological significance to intentionality[30] is question begging nonetheless. Dennett himself claims elsewhere that "our reliance on *point of view* commits us to *'mentalism'*" (Dennett 1983b: 386, emphasis added). But surely science is discerned from a point of view – namely the third person viewpoint. Dennett has not really *argued* that intentionality could be jettisoned the way he proposes, whilst preserving the reality of science, but he merely takes this as axiomatic.

Strictly, on Dennett's formulation of content (via intentional stance), it is doubtful if simple statements like 'I believe $E=MC^2$,' 'I believe the sun is a star,' 'Quarks are the most fundamental building block of nature,' '1+1=2' or the belief in Fermat's last theorem are sensible assertions *per se* for they do not yield predictive behavioral patterns, neither is physical patterns nor structural regularities predicted therefrom is ever regarded as intentional systems. So, as Baker reminds us, if according to Dennett, "the feature that someone has of

[29]The methodology of intentional stance, as Dennett claims at one point, "is the only way (I claim) to attribute content to the state of anything" (Dennett 2002a: 14).
[30] For instance, Dennett claims that in the main, it is "theorist's fiction....not one of the real things in the universe in addition to the atoms" (Dennett 1992c: 103).

believing that water freezes at 0 degrees is relative to the (possible) predictive strategies of others [i.e., by considering the antecedent intentional system]" (Baker 1987: 153), then owing to its unwieldly instrumentalism, the soundness of its proclaimed role in the individuation of physical stance (and science in general) is very much suspected. For similar reason, it is unclear how one is to trust the outcome of science when the means (intentionality as Dennett construes them) employed to ground them is nontrivially ephemeral and precarious.

Meanwhile, if the reality of beliefs and desires is undermined owing to Dennett's presuppositions, what about prediction? Science is *empty* without predictions, but prediction is rightful intentional act or concept.[31] And if, according to Dennett, there is no real intentionality but only *as if* intentionality (BC 361), what of prediction and the objects it predicts therein? Belief is justified if its ascription helps prediction of behavior, but then how is this supposed (intentional) act of prediction justified in turn on this construal?[32] Insofar as Dennett has not addressed this (and the above) issue, there remains major cleavage in his theory. In spite of his campaign to repugn folk psychological concepts/notions (BC 361), intentional concepts[33] are being illicitly employed in arguing for realism in physical stance. Consider Dennett's reason for rejecting Churchland's eliminativism in what follows:

---

[31] Morris (1991: 19) has also noted this in passing.

[32] The reasoning of Dennett's theory probably entail the followings: prediction is justified if its ascriptions help in predicting behavior! This problem of circularity plagues Dennett's other supporting pillar of intentional stance theory: interpretation.

[33] For Dennett says that among the strands of realism he is trying to undermine is the "realism about the entities purportedly described by our everyday mentalistic discourse – what I dubbed folk psychology – such as beliefs, desires, pains, the self" (BC 361).

> I choose not to follow either eliminativist branch, however. My inability to join either camp is not, like the immobility of Buridan's ass... I see a shared problem in their extreme eliminativism: until the rest of the world catches up with them and shares their worldview, what will they tell the judge? That is, when called on to give sworn testimony in a court of law, and asked by the judge whether they believe they have ever seen the defendant before, what will they say. Surely they must deny that they are saying what they believe, since they believe there is no such thing as belief... Of more importance to the philosopher of science, tactically, is not losing sight of the tremendous – if flawed predictive power of the intentional stance. The judge may be a ceremonial figure, but he is not a witch doctor; his official desire to learn what you believe is not irrational; *his method is, beyond, the best way we know of getting at the truth*... But in the mean time, he [Churchland] has to have some line on the status of the predictive and explanatory powers of not only humble folk psychology but the academic social sciences. What is going in economic models that presuppose rational agents? How can he explain the power of cognitive psychologists to design fruitful experiments that require assumptions about the beliefs their subjects have about the test situation, the desire they have inculcated in their subjects to attend to the message in the left ear, and so forth? That power is perfectly real and requires an explanation (IS 233-234, emphasis added).

Ironically, the foregoing criticism applies equally well to Dennett's own theory. For if Dennett is having scruples with complain that on eliminativist theory, they cannot say what they believe without contradicting themselves in the court of law, Dennett's intentional construal does not seem to improve the situation much. For if asked by the judge whether one has seen the defendant before, shall we tell the judge that I believe only if it helps enhance my predictive edge (in behavioral patterns),[34] for there is no such thing as belief. Or ascription of belief is largely indeterminate. In other words, there is no fact of the matter on what I believe, it has to depend on me taking a stance that yields the most predictive interpretation.[35] So, it is easy to imagine that, not unlike Churchland's brand of

---

[34] Also, as Westbury and Dennett argue, "the observer (which maybe x himself) who is making the attribution to x of a belief that p must be (implicitly or explicitly) satisfied that he is able to discern (independently of whether he actually is able to discern) the regularity that x's behavior demonstrates. In other words, in order to attribute a belief that p, an organism must simultaneously attribute to himself (that is, act in a way that seems to him to accord with) the belief 'I know what it means to believe that p.' In order to adopt the intentional stance towards others, one must also adopt it toward oneself" (Westbury and Dennett 2000: 25).

[35] As Dennett puts it, "strictly speaking, ontologically speaking, there are *no such things* as beliefs, desires, or other intentional phenomena. But the intentional idioms are 'practically indispensable,' and we should see what we can do to make sense of their employment in what Quine called an 'essentially dramatic' idiom. Not just brute facts, then, but an element of interpretation, and

materialism, one is likely to be charged with contempt of court (imprisonment, thrown out of court or asked to undergo psychiatric treatments) if one testifies with Dennett's variant of belief.[36]

Undoubtedly, we are unlikely to convince the judge with notions like 'I believe I have seen the defendant for it helps in prediction of behavioral patterns or when it is strategically fruitful for me to take up a stance.' And if it is not likely that the law could function or accommodate with belief taking up attributive/interpretive stance, there is no reason to expect that science could – at least not the kind of science currently practised. For, as pointed out, Dennett claims that the judge *method* is in fact the *best* way of getting to truth.[37] So, if intentional stance fails to pass the test in the court of law, there is more reason to believe that it is likely to be fallacious elsewhere (especially also in science).[38] Dennett further claims above that the power of intentionality (in prediction) is "perfectly real," Churchland's eliminativism is rejected because it does not explain this. But his account of it in terms of stances does not seem to come close in explaining it either (see also Lycan 1988: 519). It is nonetheless illuminating to see, in this context, Dennett's criticism of Skinner. Dennett accuses Skinner of inconsistently

dramatic interpretation at that, must be recognized in any use of the intentional vocabulary" (IS 342, emphasis added).

[36]"What is meant when it is asserted that an organism has a belief, we propose, is that its behavior can be reliably predicted by ascribing that belief to it – an act of ascription we call taking the intentional stance. The suggestion is not simply that the adoption of such a definition might be a good heuristic for side-stepping the question of what a belief 'really' is, but the stronger suggestion that all there is to having belief p is being a system that is efficiently (and, in the strongest case, most efficiently) predictable under the assumption that it believes that p. This suggestion is intended to carry ontological, rather than simply methodological, weight" (Westbury and Dennett 2000: 24-25).

[37]The way science is an odyssey of truth.

employing mentalistic terms that ought to have been repugn on account of Skinner's behavioristic underpinnings:

> [t]he vacillation is typical of Skinner. The exclusivity expressed in the last quotation is rampant in Beyond Freedom and Dignity: 'Our age is not suffering from anxiety but from accidents, crimes....' Young people refuse to get jobs 'not because they feel alienated but because of defective social environments....' A man 'makes a distinction not through some mental act of perception but because of prior contingencies'...Yet the contrary claim that these intentional terms can all be translated, and hence, presumably, can be used to make true statements in psychology, is just about as widespread. We have just seen what may be Skinner's definition of 'believe,' 'want' and 'intend'... Intentional idioms occur by the dozens in crucial roles in all of Skinner's books (BS 63).
>
> [t]he apparent successes of Skinnerian behaviorism, however rely on *hidden* intentional predictions (BS 15, emphasis added).

Hence, it may not be surprising,

> [p]erhaps some people find Skinner convincing because they don't realize that they are *interpreting* what they read with the *aid* of officially *illicit* (mentalistic) constructions (Dennett 1983b: 385, emphasis added).

Presumably, if earlier commentaries amount to anything, the same complaint seems to apply equally well to Dennett's construal of the intentional/mental via intentional stance.

As testified in these discussions, in order for science to be possible at all, mentalistic constructions are necessary and even inevitable. However, if mentalistic properties are not real, it is not clear how science could be found otherwise (see also Sharpe 1989: 237, 239; Trout 1991, Danto 1983: 359, Dretske 1988: 511). Take, for instance, particle detectors alluded to earlier. Evidently, these detectors are important *means* to probe the subatomic world. It is likewise

---

[38]As science is also certainly a method of truth *par excellence*. So, if Dennett's stances fail to live up to the requirement of law, there is no reason to expect it to perform any better in science.

uncontroversial that subatomic particles thus discovered are real.[39] However, it is hard to accept if one correspondingly argues that the means (the detector) relied thus to detect these evanescent beasts somehow appears not to be real (for they serve simply heuristic ends). If this appears untrustworthy, what then makes Dennett's belief in the reality of scientific statements (physical stance) whilst propounding irrealism of mental content any less counterintuitive, is confounding. Dennett would arguably have problems explaining the robust predictive power of belief if it is not real. If this is the case, then in light of the above analysis, there is perhaps a need to review the *primacy* Dennett bestows physical vis-à-vis intentional stances (as pointed out earlier in the beginning of the chapter).[40]

3.6 Conclusion

It is argued here that Dennett's postulation of intentional stance is at odd with the way science is generally conceived. The role intentionality plays in Dennett's intentional stance does not concur well with the way it is employed in scientific formulation. Insofar as this wedge is left wide open, Dennett's theory appears incomplete or at the worst, even erroneous. Whilst this chapter examines intentional stance in relation to science, the next chapter focuses on analyzing the viability of intentional stance as a theory of mind.

---

[39] At least from the objective scientific viewpoint, the way Dennett would concur, given his realistic construal of scientific objects.

[40]See also Seager (2000).