78-8663

ALTMAN, Ira, 1944-
THE CONCEPT OF INTELLIGENCE IN ORDINARY LANGUAGE.

City University of New York, Ph.D., 1978
Philosophy

University Microfilms International, Ann Arbor, Michigan 48106

THE CONCEPT OF INTELLIGENCE

IN ORDINARY LANGUAGE

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A dissertation submitted to the Graduate Faculty in Philosophy in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1977

This manuscript has been read and accepted for the Graduate Faculty in Philosophy in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

1/10/78 — date

Chairman of Examining Committee

1/11/78 — date

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AN ABSTRACT OF

THE CONCEPT OF INTELLIGENCE IN ORDINARY LANGUAGE

by

Ira Altman

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In The Concept of Mind Ryle makes the claim that "intelligence" is a "determinable" disposition and that it is a species of "knowing-how," a kind of ability, competence, or skill. His argument for the first of those claims focuses on the dispositional use of the concept expressed by the adjective "intelligent," and makes the claim that in order for a concept to be determinate its exemplary (action-contents) must invariably be found in the verb-form of the concept expressing its occurrence. Thus "baker" is a highly determinate dispositional concept because there exists a specific verb-form that is its exemplary: "to bake". Should a dispositional concept be lacking a verb-form, Ryle identifies it as highly generic or determinable: a grocer does many different kinds of things. There is no verb answering to an essential and specific activity of the grocer, there is no "grocing" activity, and this latter condition holds for the concept of intelligence as well, making it a highly generic or determinable concept.

What our study shows is that Ryle's use of the determinable-determinate distinction leads to misconception due to an ambiguity in that distinction. There appear to be two separable notions that are found in Ryle's conception of a "determinable" concept:

(1) a determinable concept (proper), and

(2) a polymorphous concept

To say that a concept is polymorphous is to say that there is not one unique kind of action or occurrence associated with it, but a wide range of different kinds of actions or occurrences. To say that a concept is determinable is to say that the totality of actions or occurrences associated with it have never been (nor are they likely to be) enumerated. When Ryle says that "intelligence" is determinable he means to say that it is both polymorphous and determinable. But while he provides evidence of its polymorphous, he does not show it to be determinable. Showing that a concept is one of these is not showing that it is the other. A concept can be polymorphous and determinate, and Ryle has not shown that "intelligence" is not so.

We find that intelligence has an adverbial significance. Derivative from the function of the adverb "intelligently" as a verb modifier the concept has essential reference not to specific verbs, but rather to the manner or style of proceeding of nearly any verbs descriptive of the proceedings of an agent, so that whether or not the concept of intelligence is determinable or determinate cannot be determined by grammatical features alone. The various contexts in which agents are said to act intelligently need to be surveyed in order to elicit the criteria used for the application of the concept. Whether the criteria vary without end or are invariably repeated (or something in between) can only be uncovered by such surveys.

Another distinction must be made for the avoidance of the Rylean error and that is the distinction between exemplaries and occasions. The verb in "Aristotle reasons logically" is not an

exemplary of the tendency to be logical as the verb in "He baked a cake" is an exemplary of the tendency to bake. "Reasons" in this case is an occasion in which the tendency to be logical is exemplified by the manner of reasoning that Aristotle exhibits, but the verb by itself does not do the job of exemplification (if at all), it is the adverb "logically" that clues us in to the disposition-type or action-contents being referred to. The exemplaries of a concept are either analytically or "criteriologically" connected with the concept, while occasions need not be and usually are only contingently connected. Coupling an exemplary with the adverbial form of the concept leads to redundancy in a way in which the coupling of occasions with the adverbial form of the concept does not. Thus, while there is no redundancy in "Aristotle reasons logically," there is redundancy in "Aristotle draws valid inferences logically." By failing to distinguish between exemplaries and occasions Ryle erroneously assumes that the action-contents of a disposition (that is, its exemplaries) can only be expressed by a verb-form of the concept, otherwise the concept must be indeterminate. If there are no unique action-contents (as expressed by a verb) that serve as necessary and sufficient conditions (criteria) for the application of that concept, then it has no "essential" characteristics. This it appears to Ryle is the case with "intelligent" for there is no unique verbal exemplary of intelligence such as "intelligenting." However, contrary to this claim, our study shows that intelligence words (when they express dispositions) are descriptive of the tendency to proceed in a special way, and are not descriptive of any of an innumerable variety of proceedings, no matter how innumerable the occasions in which that way

of proceeding may be exemplified. Intelligence words find their exemplaries (action-contents) not in those occasions which are described by the verbs of a sentence, but in the episode-qualifying narratives that the adverb of a sentence collects. To put this another way, the disposition to intelligence as expressed by the adjective "intelligent" finds its exemplaries (action-contents) in those process-fashions or episode-manners that "intelligently" (the adverb) names. There does not exist a unique verb of "intelligence," but this does not mean that intelligence is determinable (polymorphous and determinable), it may well be polymorphous and determinate.

Ryle's claim that intelligence is a species of "knowing-how" runs afoul of the fact that abilities can be exercised unintelligently while liabilities may be exercised intelligently. The position that intelligence and "know-how" are more or less the same thing lends credence to the supposition that intelligence is an indeterminate concept, since the number of things we may know how to do are indefinite, and so if intelligence is but a kind of ability, then it too is indeterminate. But since intelligence (as we shall find) is not an ability at all but rather a capacity (something that cannot be acquired) this support for the indeterminacy thesis fails.

We have found the insistence that unless a concept has exemplaries (action-contents) that are both necessary and sufficient conditions of its application, then it is indeterminate (polymorphous and determinable) an overly-stringent requirement. Wittgenstein shows us how it is possible in ordinary language to obtain conditions for the application of a concept that are not so sharply drawn as is the analytic-synthetic distinction, but which nevertheless permits us to

obtain a disjunction of (normic) criteria that are stronger than synthetic but weaker than analytic (necessary and sufficient) criteria. This opens the way for the possibility that the characteristic components of the concept in question (even if it be polymorphous) form a closed list (that is the list of disjuncts are not indeterminate but finite).

Holloway's analysis of the concept of intelligence is suggestive of the possibility that aside from the criteria of intelligence there may exist another listing of criteria that focuses on the antitheses or contrasts of intelligence in order to pronounce on the intelligence of some specific act within a specific context. On this account an act may be judged to be intelligent once such other possibilities as chance, instinct, and habit are ruled out of consideration. Thus, it appears, that depending on context, the criteria of intelligence may sometimes "describe" action-contents (exemplaries) characteristic of intelligent behavior, or provide us with a <u>denial</u> that the action-contents in question are characteristic of instinct or habit or chance or reflex, and so on. Such a listing of disjuncts we have dubbed <u>contrast</u>-criteria. These are contrasts between different kinds of process-fashions or styles of proceeding. Both sets of criteria for intelligence operate within a context that this concept has in common with such concepts as habits, tropisms, and instincts, and that is the means-to-ends context. They are all of them purpose-adapted styles of proceeding, and this may be one reason why some of these are confused for one another.

We conclude that intelligence-words are expressive of a manner of doing things that may be narrated in one of two ways. The

first of these narrations takes the form of a series of contrasts, which when put together as a list of disjuncts may be called the contrast-criteria of intelligence:

i. If I, then - (CvRvTvHvN)

ii. If - (CvRvTvHvN), then I

where C is chance, R is reflex, T is tropism, H is habit, and N is instinct. Quite possibly R, T, H, and N might be reduced to A: automatism, in which case the contrast-criteria would be reduced to:

iii. If I, then - (CvA)

iv. If - (CvA), then I

Another descriptive narration of intelligence may take the form not of contrasts but of characteristic activities, the criteria of intelligence:

v. If I, then $(F_s v F_n v M v T v P)$

vi. If $(F_s v F_n v M v T v P)$, then I

where F_s is self-corrective flexibility, F_n is inventive flexibility, M is multiplexity of routines, T is transference of acquired routines and P is "a sudden change in the learning curve" or (less technically) probable success.

PREFACE

When, in The Concept of Mind, Gilbert Ryle speaks of intelligence, he is interested in making it out to be a dispositional concept (his technique for refuting dualism). Unfortunately, and as one might have suspected, not all mental-conduct concepts may be so easily packaged, and part of what we wish to do here is to see whether "intelligence" may or may not be so packaged. Ryle's fear seems to be that if any mental concepts escape such an analysis, then we may be forced to give way to dualism (but this may be too hasty a conclusion). The dualistic reaction is to withdraw from the dispositional analysis (often by accepting it, not denying it) and claiming that "intelligence" can only make sense when it is ultimately linked to an alternative concept which presumably has reference to a "process" (the existence of which may be ascertained by a subjective avowal: intent, deliberation, reflective choice, etc.). Whether this maneuver avoids the Rylean critique is subject to serious doubt. Each new term introduced may itself have a problem concerning the "metaphysical" status of its referent: whether it is a physical or a "spiritual" process we are talking about. Another problem with this approach is that it often makes the concept of intelligence dependent for its meaning on concepts which may have no more than a casual relation to its meaning(s): a contextual connection for example.

It appears to this writer that while a dispositional analysis of intelligence would effectively rescue it from entrapment inside "the ghost in the machine" it might fail to do the concept the

justice that the dualist seeks for it, and that is to make the observation that it appears to be more an episodic than a dispositional concept. It is in this connection that some philosophers take a critical view of Ryle's analysis of mental concepts. Peter Thomas Geach, for instance, claims that reports of mental acts are categorical and are not hypothetical or semi-hypothetical statements about overt behavior. He believes the dispositional account of psychological concepts to be on the level with the statement that opium puts people to sleep because it has a dormative power, and that such an account if it were carried over to the physical sciences would be met with impatience:

> A physicist would be merely impatient if somebody said to him: "Why look for, or postulate, an actual difference between an unmagnetized bit of iron and a magnetized by of iron? Why not just say that if certain things are done to a bit of iron certain hypotheticals become true of it?" He would still be more impatient at being told that his enquiries were vitiated by the logical mistake of treating "x is magnetized" as categorical, whereas it is really hypothetical or semi-hypothetical.[1]

This almost certainly is a misrepresentation of the Rylean position. Ryle's analysis is in keeping with the Wittgensteinian thesis that mental language has no private sense, and while Ryle uses this thesis to undercut an ontology of mental events (a procedure resisted by Wittgenstein), his position is not (as Geach would have us believe) incompatible with the occurrence of physical processes and events that are explanatory of the hypotheticals that constitute a part of our mental-conduct language. Thus to say that the brittleness of glass (or the magnetism of a bit of iron) is a dispositional concept is not to deny that the hypotheticals in which that concept is couched are explicable in terms of categoricals: the molecular

substructure, stress and force factors, and so on. The hostility to Ryle's analysis comes not from a scientist's impatience with hypotheticals, but from a metaphysician's perception that Ryle's use of the term "categorical" is sometimes a euphemism for "private, non-physical event." The dualist then makes use of this terminology with a special vengeance: "If categorical uses of mental-conduct concepts exist, then mental events must exist." But of course we should be careful here, for this does not necessarily imply that categorical mental statements are statements about non-physical (ghostly) processes.

An earlier and more cautiously drawn critique of Ryle occurs in Stuart Hampshire's review of The Concept of Mind. He poses the question: "On what grounds does Professor Ryle decide that there are no acts answering to such verbs as 'see,' 'hear,' 'taste,' 'deduce,' and 'recall'...?"[2] He concludes that Ryle has mistakenly identified the meaning of a statement with the method of its verification:

> Because overt behavior often constitutes for most people the best and, in some conditions of utterance, the sole available evidence for statements about mental activities and states of minds, such statements come to be identified with hypothetical statements about behavior.[3]

Ryle's position is likely to prove too elusive for this criticism. While it is true that it looks as though Ryle's program is to re-interpret categorical statements about "mental events" as hypothetical statements about publicly observable events, his position is not sharply distinguished from the Wittgensteinian thesis about mental terms. As it is so often pointed out, Wittgenstein did not deny that people have private thoughts or that they have feelings they do not show (Ryle does not deny this either). Wittgenstein did want to deny that mental talk could have a meaning independent of some

connection with a public language that has outward criteria for understanding the meaning of mental talk. After all, Ryle does say (as even Hampshire recognizes) that for any given statement there are an indefinite number of possible answers to the questions: "How do you know?" or "What are the reasons for saying?" depending on who made the statement, when and in what circumstances. Though Ryle may be less than clear about the general thrust of his thesis, it may be too strong for us to accuse him of covert verificationism. There are too many qualifications and too many hedges in his analysis directed against such a reductionism for Ryle to be providing us with a "general account of the logic of statements containing mental concepts, where 'the logic' means '<u>the</u> method of establisning the truth of...'"[4]

However accurate (or inaccurate) these interpretations of Ryle's analysis may be, it is important for us to distinguish our position (where distinguishable) from Ryle's and show whether the aforementioned critiques have any relevance for our thesis. We are in agreement with those critics of Ryle who insist that mental terms often (even usually) have categorical and, therefore, episodic uses. In this respect our thesis is untouched by the criticism that Ryle's dispositional analysis attempts to eliminate the occurrence uses of mental concepts (we, for our part, are not certain that this is indeed Ryle's intent). Mental terms have episodic uses, and "intelligence", as we shall see, derives virtually all of its significance from such a use. But we do not agree that an occurrence or episodic analysis of mental concepts opens a way toward the re-introduction of mental events as "ghostly processes." As far as the concept of intelligence

is concerned, the occurrences are publicly observable: the significance of "intelligence" is predicated on outward criteria.

Our analysis is intended to be a corrective of the Rylean thesis by acknowledging some of the claims of his critics but without at the same time accepting the metaphysical dualism that such an admission is believed to yield. We can readily see from our every-day discourse that a high percentage of the terms connected with intelligence turn out to be adverbs. This is not unusual since so much of what we say about intelligence is not simply that so-and-so, or this-and-that is intelligent (that someone generally does something, or that something is done) but that it is done in a special way--whatever the verb is, it is modified. Now, adverbs generally have limited ranges of application. It does not make sense to attach them to any verbs whatsoever, no matter how extensive the range of its verbs may be.[5] It will be important in this study to determine why some actions and the verbs describing those actions may be modified by the adverb intelligently, and others not. This should yield a group of verbal narratives informative of the mechanics, as well as the "conditions" that make the use of the concept of intelligence acceptable or unacceptable in any given context.[6] The narrative descriptions (insight, flexibility, novelty, etc.) will be familiar to anyone who speaks the language. What may be surprising is the nature of the conceptual link between such narrations and "intelligence." The "logical status" of these descriptions as "conditions" for the application of the terms "intelligent" or "intelligently" may be neither merely "analytic" nor merely "synthetic." What we will discover in this study is that the variety of narrative descriptions

that the adverb "intelligently" collects may be parcelled out into at least two different sets of "conditions" for the application of the term, each with special and different contexts for its application, with different sets of "rules" for that application. Some concepts which were thought to be somehow "intrinsically" linked with intelligence (such as "intention" or "learning") will be found to be either a part of the general context (not a condition) of application, or to have a merely contingent relationship to the concept. The result will be an analysis of intelligence that is neither dualistic nor merely dispositional, but one which hopefully captures the varieties of uses made of the concept. The general thrust of our thesis will support the Rylean analysis but without failing to set the limits between the application of the concept of intelligence, and any other mental-conduct concepts whatsoever.[7]

If our analysis were to show that the concept of intelligence has reference to process-fashions as well as to contrasts with other process-fashions, none of which are un-observable (or ghostly) and none of which were merely indeterminate dispositions but determinate episodes, it would be an appreciable contribution to our understanding of mental-conduct concepts. It will be necessary to demonstrate a distinct difference between the concepts of ability, "know-how", and intelligence (as a failing in the dispositional analysis). Also, we will demonstrate the differences that exist between such concepts as intention, purpose, learning, and intelligence, thereby blocking their purported candidacy as analytic conditions for the application of intelligence terms. Examples will be chosen from the psychological and biological literature to illustrate

both professional and commonplace uses of the words of intelligence in order to obtain a sampling of these different uses that might serve as "criteria" for the application of the words of "intelligence." This will require a discussion of the status of such "criteria." The discovery will be made that they cannot be described as either analytic or synthetic, and that there does not exist a single criterion or single class of criteria, but at least two groupings of different criteria (not mutually incompatible) with a different basis of use dependent on differences of comparison with other concepts and contexts.

[1]P. T. Geach, Mental Acts: Their Content and Their Object (London: Routledge & Kegan Paul, 1956), p. 6

[2]Stuart Hampshire, Review of Ryle's The Concept of Mind in Mind, Vo. 59 (1949-1950), 242.

[3]Ibid., p. 247

[4]Ibid.

[5] If such limits of application exist, they would constitute a basis for the rejection of Ryle's claim that the dispositional concept of intelligence is determinable rather than determinate.

[6]"Not merely do adverbial expressions pick out classes of action, they also pick out the internal details of the machinery of doing actions, or the departments into which the business doing actions is organized." J. L. Austin, "A Plea For Excuses," in Philosopical Papers, ed. by J. O. Urmson and G. J. Warnock (New York: Oxford U. Press, 1970), p. 193.

[7]It is because of a failure to set limits (as in Ryle's description of "intelligent" as a determinable disposition) that the concept of intelligence becomes so easily confused with such concepts as learning and "know-how" in the minds of some philosophers (and I may add, psychologists) to the extent that they fail to see some rather obvious differences that exist between them.

CHAPTER I

RYLE ON INTELLIGENCE

In his analysis of "intelligence" Gilbert Ryle shows an explicit interest in exorcising the occult episodes which are said by dualists to be the causes of overt intelligent acts and utterances.[1] He argues against "the intellectualist legend" which purports to explain intelligent activity by reference to a prior performance of a special kind, namely a mental act. Every intelligent performance according to this thesis is intelligent due to the fact that it was preceded by reflection (or apprehension)-- a mental performance or series of performances unobserved and unobservable by anyone but the agent--in which there is a private acknowledgement of the rules, criteria, maxims, or "regulative propositions" by which the act is to be performed. Thus every overt intelligent act is a captive of and inherits its intelligence from, some prior act of a different order.

Ryle interprets this account of intelligence as arising out of an illegitimate conflation of the dual but differing notions of "knowing how" and "knowing that." To "know that" is merely to acquire or apprehend truths (propositions that are asserted as true). To "know how" is to perform a task well and to meet certain standards in the execution of the task. But to be intelligent is more than this: the agent must be a responsible regulator of his actions--he has to apply criteria not just meet them or be regulated by them.[2]

The difficulty with viewing intelligence as the performance of dual operations, the first psychological, the second physical (considering, then executing), according to Ryle, is that this description does not solve the problem of intelligence. It simply transfers the problem to an earlier stage in the process described, and recreates the original dilemma: We can always ask the question: "Is this intelligent?" of the internal psychological performance as easily and legitimately as we do of the overt physical one that purportedly borrows its intelligence from the former. If it is not intelligent, then why should we suppose that it gives rise to intelligent consequences?--and if it is intelligent, once again we may ask why it is so. If the answer is that a prior psychological operation was performed (which is the answer that must be given if we are to maintain the model), then we are involved in a never-ending regress.

The positive account of intelligence that Ryle provides us with as an alternative to the "intellectualist legend" is that "intelligence" is a dispositional concept. According to this account dispositional assertions are not reports of observed (or observable) states of affairs or occurrences, or reports of unobserved (or unobservable) states of affairs or occurrences but rather that someone or something is bound or liable to be in a particular state or to undergo a particular change(s) when appropriate conditions are present. But "intelligence" as a dispositional concept belongs to a further sub-division of such concepts: it is a determinable rather than a determinate disposition. By this Ryle means to say that to say that someone is intelligent is to say not that he is disposed to do

things of a unique sort (as a "runner" would be) but things of a variety of different sorts (as would a lawyer). From this Ryle draws the further generalization that there is no typical performance or activity that can unqualifiedly count as intelligent, nor can there in any sense be anything like an "essence" of intelligence.[3]

We can summarize his more detailed remarks concerning intelligence in the following manner: "Intelligence" belongs to that class of mental-conduct concepts already discussed under the rubric "knowing how". A general feature of this class of mental-conduct concepts is that they refer to an ability (acquired by practice) to bring things off through an adherence to specifiable criteria and/or standards of procedure.[4] Intelligence is consequently an ability to perform "in a certain manner, or with a certain style of procedure."[5] But this procedure to be considered intelligent must be operative in a special context and must satisfy some special conditions.[6] First, the performance must be attributable to an agent (usually a person) to whom we can ascribe responsibility. Second, the agent must play an active, not a passive, role in the performance--he must mind what he is doing ("exercise care, vigilance or criticism"), that is, regulate or control his actions throughout the performance. Finally, there must be a goal (the agent's purpose) for which and to which the performances are directed by the agent.

The characteristics of intelligent action are thrown into relief by contrasting them with habits--especially with respect to the modes of acquisition: Habitual performances are inculcated by drill ("the imposition of repetitions"). They are automatic and may be done without the agent thinking what he is doing. Intelligent performances

are developed by training ("the stimulation by criticism and example of the pupil's judgement"). They are innovative and require that the agent think what he is doing. Intelligent practices are often modified by previous performances. They are therefore novel and may themselves serve as lessons for even further modification of practice. In addition, Ryle provides us with a list of some of the "more determinate" epithets of intelligence, the adjectives:

> "Clever," "sensible," "careful," "methodical," "inventive," "prudent," "acute," "logical," "witty," "observant," "critical," "experimental," "quick-witted,"[7] "cunning," "wise," "judicious," and "scrupulous,"[8] ..."sagacious,"[9] ..."alert,"... "ingenious"..."skillful," "inspired"...

--and their opposite deficiencies in intelligence:

> ..."stupid,"..."dull," "silly," "careless," "unmethodical," "uninventive," "rash," "dense," "illogical," "humorless," "unobservant," "uncritical," "unexperimental," "slow," "simple," "unwise," and "unjudicious."[10]

We may begin our inquiry by taking note of some of the more mundane grammatical features of the concept of intelligence. The words of intelligence like other words in the language have a noun form: intelligence; and an adjective form: intelligent; and an adverb form: intelligently. Interestingly, it has no verb form.

The grammatical form that Ryle openly focuses his attention on throughout his analysis is the adjective form. We can understand a philosopher's lack of interest in the theoretically barren nominal use of the word (a noun does its work by denoting persons, places, things, and qualities, and it is difficult to obtain any philosophically interesting information from this). But why does he display a reluctance to provide a thorough analysis of the adverbial form of this word? The adverb does its work by modifying or limiting a verb,[11] while verbs in their turn express the occurrence of an action.

The reason for avoidance becomes perspicuous: the adverbial form of the word may be too closely related to an occurrence. The adjective form is given a relatively lucid and explicit exposition, for since it lends itself to a dispositional analysis, it does not attribute on-going behavior in the agent, and therefore no occult goings-on either. Ryle does nonetheless make some noteworthy references to the espisodic uses of the word. When speaking of dispositional concepts in general he tells us:

> Dispositional statements...narrate no incidents. But their jobs are intimately connected with narratives of incidents, for, if they are true, they are satisfied by narrated incidents.[12]

This undoubtedly is true of disposition statements. But what might we say of those narratives of incidents with which they are admitted to be so intimately connected? If we consider the use of a disposition-word like "grocer" we discover (what for Ryle must have been a fortunate discovery) that it has neither a verbal nor adverbial form. So that the narrated incidents by which this disposition word is satisfied can never make use of either an episodic or occurrence-qualifying form of this word: there is no such thing as a "grocing" activity, nor are there any doings which are "grocerly."

> ...some dispositional words are highly generic or determinable, while others are highly specific or determinate; the verbs with which we report the different exercises of generic tendencies, capacities and liabilities are apt to differ from the verbs with which we name the dispositions, while the episodic verbs corresponding to the highly specific dispositional verbs are apt to be the same. A baker can be baking now, but a grocer is not described as "grocing" now, but only as selling sugar now, or weighing tea now, or wrapping butter now.[13]

Not all dispositon words lack verbal (and adverbial) parts of speech however. "Baker" has a verb form: "bake," but no adverbial form. "Joker" has a verb form: "joke"; and an adverbial form: "jokingly." "Logical" has no verb form, but an adverbial form: "logically."

It should be clear from just these few examples that we cannot safely assume that what is true of one or more disposition-words is true for the whole class of such words; that if there are no occurrence uses and/or no occurrence-qualifying uses of a disposition word that there aren't such for any disposition-word. Ryle has a right to admonish those who insist that all true indicative sentences be descriptive of facts or reports of events. But the point after all is not that there are no indicative sentences that do such work, but rather that not all sentences in all circumstances do the same job. By the same token, no word is so morphologically pure that it has but one grammatical occupation. Different grammatical forms have different avocations. The same term with ever so slight a variance in structure and sentential position may be used dispositionally or episodically.

In a rather revealing passage we find Ryle saying (contrary to his usual avowals, if not his practice) that:

> ...to operate efficiently...is to perform one operation in a certain manner or with a certain style of procedure...[14]

Note that we have the adverbial form of the dispositional adjective: "efficient" and that what is being characterized is an operation, an occurrence. It is here that Ryle comes closest to an explicit recognition that "intelligence" may have an episodic as well as a dispositional use for he tells us in a rather circumlocutionary fashion that intelligence epithets such as "alert," "careful," "critical," " ingenious," and "logical," are semi-dispositional and semi-episodic.[15] Thus, while Ryle willingly concedes that dispositonal statements are intimately connected with narratives of incidents, he couples this with the claim that there are many disposition-words

which have no counterpart verbal use, and hence the assumption that there is a single corresponding episode is vitiated. However, the existence of the adverbial form for some disposition words (even when there does not exist a verbal form) suggests the possibility that there may be a single narrative of incident-sorts corresponding to the adverb.

There is no vacillation on his part when it comes to a discussion of tendencies and capacities other than "intelligent." He allows without reservation that their disposition-words would be non-existent were it not for the existence of processes and episodes from which they derive their tendency-stating and capacity-stating expressions:

> The tendency to ruminate and the habit of cigarette-smoking could not exist, unless there were such processes or episodes as ruminating and smoking cigarettes... The phrase "smoke a cigarette" has both episodic uses, and, derivative from them, tendency-stating uses.[16]

He goes on to say however that this is not true in all cases; that there are many disposition-words which while they refer to tendencies and capacities have no correspondingly similar expressions for the reporting of occurrences. The reasons for this he explains is that there does not exist a verb that corresponds with the adjective, and this for the reason that such dispositional adjectives do not collect tendencies to act in on e specific way but rather many different ways, thus:

> ...there is a wide range of different actions and reactions predictable for the description of someone as "greedy", while there is, roughly, only one sort of action predicted from the description of someone as a "cigarette-smoker."[17]

This is the distinction he draws between "the highly generic or determinable" and "the highly specific or determinate" dis-

positon-words. "Intelligent" belongs to the former and not the latter.

The philosophical upshot of these grammatical claims is that "intelligence" (like "grocer") because it does not have a verb to express unique episodes, cannot have determinate uses. That is, there are no highly specific characteristics of "intelligence" and thus no "essence" of intelligence.

> There is no unique episode, the occurrence of which is a necessary or sufficient condition of having indigestion. "Indigestion" does not, therefore, stand for any such unique episode. In the same way a sulky or hilarious person may or may not say certain things, talk in a certain tone of voice, grimace or gesticulate in certain ways, have certain daydreams or register certain feelings. Being sulky or hilarious requires some or other of these and further appropriate actions and reactions, but there is no one of them which is a necessary and sufficient condition of being sulky or hilarious. "Sulkiness" and "hilarity" does not, therefore, stand for any one specific action or reaction.[18]

When this claim is coupled with the claim that there must exist processes and episodes from which disposition-words derive their tendency-stating and capacity-stating expressions some ambiguity may arise. Clearly, if we can rule out a unique episode answering to a dispositional concept (by pointing out that there do not exist any verbs that would express it) we would <u>a fortiori</u> rule out a unique <u>mental</u> episode. However, we may well wonder whether the existence or non-existence of a verb form of a concept will conclusively decide the issue. After all, the existence of verbs such as "see," "hear," "taste," "deduce," and "recall" (highly specific though they are) does not prompt Ryle to surmise, in the opposite direction (if only for the sake of symmetry) that there exist unique episodes or processes which they are used to express. Hence his critics may well wonder why the lack of a verb form <u>must</u> show that there cannot be a unique categorical description corresponding to such hypotheticals as "intelligent." The ambiguity in Ryle's position becomes more obvious

when we ask how we recognize which of the many actions and reactions are appropriate and which are not for the ascription of a disposition. If it is too strong a requirement that there be necessary and sufficient conditions of "intelligence" (a position which we may very well agree with), some way of expressing the "appropriate" conditions for its ascription should still exist. While this may not mean that there is a unique categorical description (and hence a unique psychological state or process) there may nonetheless exist a finite set of such categorical narratives from which the disposition word derives. Indeed, Ryle's analysis of intelligence suggests this, but his claim that the concept is indeterminate suggests just the opposite--to the point where one might wonder what the conceptual boundaries of the concept might be.

Determinate and Determinable Dispositions

Ryle's demonstration of the determinable character of "intelligent" takes the form of an argument-from-analogy. The highly generic "grocer" does not have a verb counterpart such as "grocing," while the highly specific "baker" does have a verb counterpart: "baking."[19] Also, disposition-words like "clever" are determinable because "they signify...tendencies...to do, not things of one unique kind but of many different kinds."[20] What presumably lies behind this argument is that words like "clever" and "intelligent" have no parallel verb forms such as "clevering", or "intelligenting," and in this they are indeed similar to words like "grocer," and unlike words like "baker." Since they are more akin to "grocer," which is a highly generic disposition (for to be a grocer is to do many different kinds of things) they too must be highly generic or determinable

dispositions. The problem is that arguments from analogy are rarely decisive and this because their force is derived from the degree of similarity between the analogues. Unhappily for Ryle's neat distinction between determinable and determinate dispositions, "intelligent" and "clever" are like "grocer" only insofar as they have no verb forms; they are unlike "grocer" however in that they both have what it does not, an adverbial form: "intelligently" and "cleverly." Hence they appear to be members of a class of disposition-words altogether other than the ones Ryle attempts to assimilate them to. They belong to a class of disposition-words which unlike "baker" (this is Ryle's point) have no verb counterpart and consequently cannot be used to describe or report a unique process or occurrence. On the other hand (contrary to Ryle's claim), this class of disposition-words unlike "grocer" have an adverbial counterpart and consequently can be used to do a job that words like "grocer" cannot do. They are neither like "baker" nor "grocer." They belong to yet another dispositional type: namely those dispositions that derive their tendency-stating and capacity-stating expressions not from any particular process or episode but rather from the unique manner or style of procedure of any process or episode that falls under the adverbial description. Because the adverb is a verb modifier or qualifier, such dispositional words are satisfied in the occurrence of any episodes having the unique manner or fashion of occurrence indicated by the use of the adverb. Such disposition-words, while they have an indirect reference to processes and episodes, do not collect those processes and episodes but rather their manner or fashion of proceeding; these might then be termed "style-setting" dispositions.

Take as an example the disposition-word "logical." Like "intelligent" it does not have a verb-form, but does have an adverbial form: "logically." Now, the adverb "logically" may modify any of a wide variety of verbs appearing in a narrative description of some one or other of a wide variety of occurrences or episodes, as in "Sally approaches every problem logically," or "Aristotle reasons logically," or "We could logically expect war as a consequence." We can readily see that it is neither "reasoning," nor "expecting," nor "approaching," which are unique verbal counterparts of the disposition-word "logical." But should we draw from this the conclusion that "logical" is indeterminate because there is no unique verb "logicing" that can be used to express a unique occurrence? Or is it rather not that the adverb "logically" requires explication such that we uncover the unique "conditions" permitting us to qualify many different occurrences by that same term, and from which the dispositional concept "logical" is derivative. "Logical" may then be a determinate disposition in the sense that there may exist a unique set of descriptive narratives from which it is derivative, descriptions not of occurrences or processes alone, but something closely allied, the manner, fashion, or style with which those occurrences or processes take place. By a fashion, manner, or style of proceeding we mean that however variant the episodes alluded to may be, those different episodes occur in conformance with some particular "standards" that serve to identify those different episodes as of a specifiable kind. In the case of "logical" what is common to all such episodes, as were described by the different verbs, is roughly that they are governed by principles of correct or reliable inference.

Now, it may be thought that Ryle claims pretty much the same thing (see footnote #14). However, as we have already noted, he cloaks it in ambiguity when he suggests the unlikelihood of providing a unique narrative description of intelligence by saying that it is an indeterminate disposition. Our disagreement with Ryle is not one of principle. It is rather aimed at dispelling the ambiguity of his position on intelligence, by disallowing the suggestion that the concept is indeterminate (in one sense of the term), and by expanding on the point (which is no more than a suggestion in Ryle) that intelligence is a certain manner or style of proceeding.

The fact that some disposition-words are intimately connected with adverbs shows us that the determinable-determinate distinction ranges beyond the one dimension (or variable) Ryle alludes to: whether a disposition collects narratives of processes or episodes expressed by a unique verb. A disposition may also be determinate or determinable with respect to its adverbial counterparts--that is, a disposition-word may derive its meaning by collecting narratives of process-fashions or episode-manners as expressed by a unique adverbial counterpart. Thus the logical disposition, cited above, collects narratives of procedure-fashions that are highly specific, namely, that way of proceeding that is directed by principles of correct or reliable inference. However, the episodes in which this occurs are many and various. So, "logical" is determinable with respect to any verbal narratives with which it is associated, but determinate with respect to its adverbial narratives. Of course without the adverb "logically" being implicitly or explicitly used in such narrations the concept would have no connection with the verbs of that narration. By

an expansion of the logical possibilities involved (2^n) we find that there are four different mixes or distributions of the determinable-determinate distinction among dispositions:

(1) Dispositions that are determinable with respect to their verbal and adverbial expressions (like "grocer").

(2) Dispositions that are determinate with respect to their verbal and adverbial counterpart expressions: "joker" has both a unique verbal expression "joking" and adverbial expression "jokingly."

(3) Dispositions that are determinable with respect to their verbal expressions, but not their adverbial expressions, towards which they are determinate (like "logical" above).

(4) Dispositions that are determinable with respect to their adverbial expressions, but not their verbal expressions toward which they are determinate: "baker" has a unique verbal expression "baking" ("bakes," etc.) but may take on many and varied adverbial expressions (e.g.: bakes <u>well</u>, <u>badly</u>, in the French way, etc.).

The claim that there cannot be anything like an "essence" of intelligence is partially vitiated by this discovery. For the claim is maintained by dint of the assumption that if there were an "essence" of intelligence it could only be so if the disposition-word "intelligent" were determinate with respect to the verbal narratives it collects. That is, if there were some one occurrence expressed by the verb, and if this were a necessary and sufficient condition for that disposition, then we would have an "essence" of intelligence. But since its verbal counterparts are not of one unique kind, but many different kinds, the possibility of giving a unique formulation of intelligence is ruled out. Now we see that for Ryle to make good this

claim, he must also be able to rule out the possibility that "intelligent" collects a unique adverbial counterpart. His case has not been established in the event that such an adverb exists. For it may very well turn out to be expressive of necessary and sufficient conditions for the disposition. But even barring such a strict formulation of "essence," it may still be possible to give a highly specific formulation of intelligence by explicating the adverbial narration, and finding that the conditions for its application form a finite list, even if they cannot be characterized as necessary and sufficient conditions.

The introduction of a somewhat more technical vocabulary may be in order at this point to facilitate our grasp of the logic of dispositional concepts as they relate to the concept of intelligence. T. R. Miles[21] (who follows Ryle in his analysis of intelligence) uses the term "polymorphous" where Ryle says "determinable.":

> The concepts "grocer" and "solicitor" are, we might say, polymorphous as compared with the concept "baker." A baker, qua baker, does one thing only--he bakes. A grocer does all sorts of different things--he weighs out sugar, he sells butter, he cuts bacon, and so on.[22]

Miles refers to the disposition-word itself as the "substrate," and he uses the term "exemplary" when speaking of an actual or possible manifestation of a disposition. Thus when the baker actually bakes a cake, we have an "exemplar" of "baker." This compares with the occurrences that certain "narrative descriptions" express, from which, Ryle claims, we derive the tendency-stating expressions of certain dispositions. The term "open" is reserved for those dispositions whose exemplaries have never been (nor are likely to be) listed, and this is meant to be characteristic of the word "intelligent":

> Finally, it should be stressed that the list of exemplaries carried by the word "intelligent" is open. In other words, no one has ever made any precise legislation as to what shall or shall not count as exemplaries of the word "intelligent"; nor is there any precise list laid up in heaven for the discerning to discover.[23]

This last point permits us more clearly to see the ambiguity in Ryle's notion of determinable dispositions. Presumably Miles and Ryle are presenting us with a similar analysis of intelligence with but a slight difference of terminology. Miles says that the concept of intelligence is polymorphous and open, and Ryle says it is a determinable concept. But what is Ryle's position with respect to the "openness of intelligence"? To say that the concept is polymorphous is to say that there is not one unique kind of action or occurrence associated with a disposition, but a wide range of different kinds of actions or occurrences, and this is also what is meant by the disposition being determinable. But does a concept that is determinable require that it be open (in Miles' sense)? The implication in Miles' analysis is no, although "intelligent" happens to be both polymorphous and open. The suggestion in Ryle's analysis is that to be determinable is to be "open", and so Miles and Ryle seem to be in agreement over the proper analysis of intelligence. However, it is far from clear from Ryle's analysis that this must be our interpretation of intelligence. For the possibility remains (it is nowhere explicitly denied by Ryle) that the concept of intelligence is polymorphous and determinate. In other words, while there is no unique action or occurrence to be predicted from the ascription of someone as intelligent, there may be a finite range of possible actions (of a unique kind) predictable, and hence a list may be specifiable.

These distinctions, together with another distinction which

we must now add as derivative from our analysis of the adverbial significance of intelligence, will serve to futher clarify our disagreement with Ryle's analysis. This further distinction is the distinction between the exemplaries of a substrate and the occasions in which that substrate is exemplified. This may be illustrated by using our former example of "being logical." The verb in "Aristotle reasons logically" is not an exemplification of the tendency to be logical, as the verb in "He baked a cake" is an exemplary of the tendency to bake. Rather, the verb is expressive of an act which we shall call the occasion in which the tendency to be logical is exemplified. The exemplary of this disposition is to be discerned by explicating the manner or fashion of reasoning that the adverb "logically" expresses. Of course the occasions may differ as in "Sally approaches every problem logically," or "We could logically expect war as a consequence" and so on indefinitely. In other words, the list of occasions is not just "polymorphous" but determinable. However, the manner or fashion in which these occasions are manifested has a unique range of characteristics. Some members of this range of characteristics are descriptive of each of these different occasions, and are indicated in all of them by the use of the adverb "logically." They constitute some of the exemplaries of the dispositional concept. They include such features as "the avoidance of inconsistency," "making valid inferences," "rejecting invalid inferences" and so on. Whether this list of exemplaries is determinable or determinate cannot be ascertained by an examination of the grammatical features of any given sentence alone, although enough has been said to show that the exemplaries are polymorphous--there is not one sort of behavior which

is logical behavior but a range (whether determinable or determinate) of different sorts of behavior.

This represents a departure from Miles' use of the terms "exemplary," "polymorphous," and "determinable." Miles uses "exemplary" to indiscriminately refer to both occasions and manifestations of a disposition.[24] However, a distinction is required. For not every occasion need manifest a disposition, and the manifestation of a disposition must in some way be indicated (usually by the verb or the adverb). Furthermore, we have extended the application of "polymorphous" and "open" or determinable to occasions as well as to exemplaries. We must always be careful then to distinguish between occasions and exemplaries. The actual or possible episodes in which the disposition is manifested is to count as its occasions (expressed by a verbal narrative), while exemplaries are those verbal or adverbial narratives expressive of the characteristics of a disposition descriptive of all of its occasions.

What is at issue with respect to these dispositional concepts is whether or not they have determinable or determinate (verbally or adverbially expressed) exemplaries rather than whether or not they have polymorphous or non-polymorphous (that is unique) exemplaries. It is precisely on this point that Ryle and Miles are ambiguous, and where a confusion between exemplaries and occasions sets in. Ryle's analysis tells us only one thing for certain, and that is, that intelligence is polymorphous with respect to what Miles calls its exemplaries (but what we discern to be its occasions) and leaves us in the dark concerning the problem of whether or not these exemplaries are determinable. Furthermore, the decision that intelli-

gence is polymorphous was arrived at by focusing on the verbal narratives associated with the concept that happen to be its occasions (which indeed turn out to be polymorphous, and may perhaps be determinable as well, though this is by no means clear), which suggests that "intelligence" is determinable. However, it is the adverb that expresses the exemplaries of the concept, and whether on this basis intelligence is polymorphous and determinable remains to be examined. By focusing on the verbal exemplaries of "grocer" and "baker," and discovering that these are either determinable (polymorphous) or determinate (unique), he is misled into seeking the exemplaries of "intelligent" in the verbal expressions it collects, and finds that they report the doing of many different kinds of things, not one unique kind of thing: and hence that this disposition too must be highly generic (by which he seems to mean both polymorphous and determinable). However, while "intelligent" collects many different kinds of verbal expressions these are reports of occasions in which its exemplaries occur.

"Intelligent" finds its exemplaries not in the verb, but in the adverb, and appears to be polymorphous. However, while we can say in advance whether a disposition-word derives from a highly generic (polymorphous) verbal or adverbial narrative or not, by direct examination, we cannot by virtue of grammatical features alone determine whether the exemplaries of the concept are determinable or determinate. For this requires an independent analysis of those characteristics of the concept which different occasions manifest but have in common with each other.

To sum up, our criticism of Ryle's claim concerning the determinable character of intelligence is that (a) it is vague as to

whether intelligence is merely polymorphous or whether it is both polymorphous and determinable, and (b) Ryle (as well as Miles) fails to distinguish between occasions and exemplaries thereby erroneously suggesting that we are to seek the exemplaries of intelligence in the verb form (as in "baker") and if such a verb form does not exist (as in "grocer"), then the concept is highly generic or determinable (polymorphous and determinable, or just polymorphous?). The question as to whether "intelligence" is determinable is left unresolved by an examination of the grammatical features of this concept.

Knowing How

As we have already noted, Ryle treats "intelligence" as a sub-class of "knowing how." The mental-conduct concept "knowing how" is spoken of by Ryle sometimes as a capacity, and sometimes as an ability: the capacity to find out truths, or the ability (acquired by practice) to bring things off. If a distinction between "knowing how" and "intelligent" exists at all, it resides in the additional fact that "intelligent," while it meets criteria and satisfies standards in those performances it brings off well (which is characteristic of "knowing how"), also employs criteria and applies standards throughout its performance; and has a legitimate use only with respect to responsible agents who control and mind what they do.[25]

It will be our purpose in this section to show that "intelligent" is not a species of "knowing how" especially in the sense of an ability (conversely, "knowing how" is not a capacity), and that the only similarities between them is that both have a dispositional use, and that both may belong to that class of concepts we have termed "style-setting" dispositions. The description of someone as "knowing how" may be expressive of a manner, fashion, or style of

proceeding, but not the same manner, fashion, or style of proceeding that is expressed by "intelligent."

Knowing how to dance the Tango, for example, would require one to employ criteria and apply standards throughout one's performance, such that the dance exhibits the long gliding steps and intricate movements characteristic of it, and while it may be possible to do this intelligently (which may add grace and polish to the performance) it may be brought off perhaps not just as well (but well enough) mechanically. It would not thereby be any the less a knowing how to dance the Tango.

While there exists a genuine relationship between these two concepts, it is not a relation between genus and species (and is most assuredly not synonymy). It is rather that intelligence is often displayed in the exercise of many kinds of abilities (skills and habits) which fall under the rubric of "knowing how." By the same token however, intelligence can be displayed in the exercise of one's liabilities, while stupidity may be exhibited in the exercise of one's abilities:

> Suppose an adult to be playing a game of chess with a sick child. The sick child is desperately anxious to win; the adult is playing the game in order to keep the child happy. But the adult exercises all of his skill to win again and again and the child in fact is bitterly disappointed. An onlooker might well stigmatize the adult's behavior as thoroughly unintelligent.[26]

The converse of this can be shown if we assume that the adult in this example has but a rudimentary knowledge of how to play chess, while the child has more experience in the game. The adult seeing that the sick child is desperately anxious to win concedes to the wishes of the child to play the game (telling him that he is a chess-master), and repeatedly loses in the game due to a genuine lack

of ability.

Ryle makes rather a free use of such expressions as "ability," "capacity," and "competence" with reference to intelligence and knowing how. The expressions in question are lumped together as though they were equally expressive of the two concepts under consideration. But we should be wary of the seductive (and probably erroneous) suggestion that intelligence and know-how come down to much the same thing. While there are cases in which "capacity," and "ability" (and hence "competence") are more or less interchangeable, these expressions often have quite different uses in certain contexts; and how these expressions are used with respect to the concepts "intelligent" and "knowing how" has a great effect on our understanding or misunderstanding the similarities and differences between them.

In a section devoted to an analysis of "knowing how" we are told that:

> When a person is described by one or other of the intelligence epithets...the description imputes to him...the ability or inability, to do certain sorts of things.[27]

Whether or not the more specific epithets of intelligence connote specific abilities or liabilities, the import of the above assertion is that to ascribe intelligence to a subject is to impute to him, as in the case of "knowing how," the ability or inability to do certain sorts of things. Lest there be any doubt concerning this suggestion, Ryle says (by implication) that such activities as playing an instrument, pruning trees, playing chess, swimming, and talking grammatically are not only examples of "knowing how" but also exercises of intelligence. Alternatively, knowing how is spoken of as a capacity.[28] There is in all this a rather gratuitous oversight of

some of those subsidiary features of "ability" and "capacity" that may very well be instrumental in showing that "intelligent" and "knowing-how" are not more or less alike.

Ryle comes within a hair's breadth of noticing the distinctions that sometimes exist between abilities and capacities when he says (albeit not all abilities are tendencies):

> Tendencies are different from capacities and liabilities. "Would, if..." differs from "could"; and "regularly does...when..." differs from "can." Roughly, to say can is to say that it is not a certainty that something will not be the case, while, to say "tends," "keeps on," or "is prone," is to say that it is a good bet that it will be, or was, the case.[29]

However, this is asserted in the context of a discussion that does not concern itself with the concepts of intelligence and know how, nor does Ryle ever link up these remarks with them.

An amplification of these distinctions when applied to the concepts of intelligence and know how will show that Ryle mistakenly characterizes intelligence as an ability (see quote #27). This makes it easy for him to assimilate intelligence to knowing how (ability), which further helps to support the erroneous contention that "intelligent" is determinable (since there is no finite list of things we know how to do). Furthermore, when Ryle speaks of "knowing how" as a capacity, he suggests (since intelligence is a capacity) that "knowing how" and "intelligent" are more or less interchangeable (which they are not).

"Ability" is sometimes used interchangeably with "capacity," especially where the latter is (in a somewhat Pickwickian sense) thought of as containing a set of abilities. But when "ability" is used in the sense of a specific competence or skill it is quite

different from "capacity." When we ascribe abilities to someone in this sense we do so on the basis of observed past performances; we can say of "ability" that it is a "backward-looking" noun: "he can do so and so" is justified by "He has done so and so."[30] On the other hand, "capacity" is a "forward-looking" noun: when we ascribe capacities to someone, we do so not so much on the basis of observed past performances as on the basis of certain signal-conditions for their existence; the ascription of capacities is more chancy than that of abilities, and one does not imply that anything has or will be done:

> Thus if they see a man with bulging leg muscles but who as we should say has not the use of his legs for some reason or other, they say he is a man who can run fast. The drawn image of a man which shows large biceps they describe as representing a man "who can throw a spear far".[31]

There are other important differences between capacities and abilities. Capacities, like knacks and talents, can be developed (they can be neglected, or even lost), but unlike abilities they cannot be learned (or forgotten). Abilitities-as-skills must be learned, and hence can be taught (they may or may not be fogotten). While an ability has reference to the past performance of a certain sort of action, a capacity has reference to conditions permitting the performance of specific as well as different sorts of actions.[32]

In order for someone to learn a dance he must be in possession of certain physical capacities. A teacher can develop such existing capacities by the teaching of specific dances. If such capacities are not possessed, nothing that the teacher does can help the pupil acquire the ability to dance this dance. The capacity itself cannot be learned or taught, only the ability which presupposes the existence of such capacities. What is true of physical capacities is likewise true of intellectual capacities:

> A person with no intellectual capacities cannot learn the skills of philosphical argument; the best teacher cannot sharpen a non-existent wit, yet he can and does develop existing capacities by the teaching of particular skills.[33]

Intelligence is an intellectual capacity rather than (what Ryle claims) an intellectual ability or a "knowing how." If it is in any way like an ability, it is an ability to acquire abilities in a specific way or manner. This "ability" itself cannot be learned, it must already exist as a pre-condition for the learning of particular intellectual skills.

The basis for confusing "intelligence" (as a capacity) with "knowing how" (as an ability) is that the existence of this capacity is often signalled by a display of specific (acquired) intellectual skills, the performance of which is executed in a distinctive fashion or manner. However, this does not permit us to conclude that in every case of failure in a given task, where our liabilities are exemplified, we have an unintelligent performance.

The crucial objection to Ryle's assimilation of "intelligence" to "knowing how" turns out to be the objection that "intelligence" is not solely descriptive of those circumstances in which a task is brought off well. It may just as easily be used to describe the style or manner of proceeding in which the outcome is ill-fated and is brought off badly:

> Consider the case of a man who uses subtle techniques of flattery towards someone powerful who is well known to be suspicious of adulation. "how unintelligent of him," people say, "all that he can do if he goes on like that is to antagonize the Vice-Chancellor." But suppose his aim is to antagonize. Then in this sense his behavior is highly intelligent.[34]

Alternatively, there are as many instances where bringing things off well and skillfully may be an indication of a general lack of intelligence (see quote #26). These differences between abilities

(and liabilities) and capacities (or incapacities) serve to show that the description of someone as intelligent need not impute to him the ability or inability to do certain sorts of things but rather (as our examples show) the capacity to adjust one's abilities or liabilities to the purpose at hand. Intelligence is not more or less a kind of "knowing how" as suggested by Ryle. But the existence of certain abilities may signal the existence of intelligence. An individual must have the capacity to learn the techniques of the calculus (as well as the stratagems) before he has the ability to solve specific problems in it--but then, having the ability ("knowing how") to do so shows that one has at least had the capacity to learn how to do it, and this was not itself a "knowing how." "Knowing now" and intelligence cannot be more or less the same kind of thing if it is possible (as our examples again show) for abilities to be exercised unintelligently, and for liabilities (a lack of "knowing now") to be exercised intelligently.

Intelligence Epithets

We ended our summary of Ryle's analysis of intelligence with a list of words he calls intelligence epithets together with another list of words which are meant to be epithets of intelligence deficiencies. By calling these intelligence epithets he suggests that they are adjectives or other terms that express the attributes or characteristics of intelligence. In other words, these terms provide us (in more specific contexts and circumstances) with somewhat more "determinate" (but still "determinable") dispositional traits than either "intelligent" or "unintelligent." It seems moreover that we use these terms in

the same vernacular as we do the words "intelligent" and "unintelligent," as the ability or inability to do certain sorts of things. However, in neither of the two lists do we find a word that has reference to an ability or an inability to do certain sorts of things. What we do find (and this accrues to Ryle's credit) are words that are commonly used as adverbs as well as adjectives. This should clue us in to the fact that these are what we have termed style-setting disposition-words. That is, they belong to that class of disposition-words that are expressive of a manner or fashion of proceeding indentified by its conformance to some specifiable paradigms or "standards." The episode-manners or fashions, by which the dispositions they express are satisfied, are themselves expressed not by the verbs (which express the occasions in which they occur) but by the adverbs of a narrative description-- and this happens also to be the case with "intelligent" and "unintelligent." However not all style-setting disposition-words are intelligence epithets, and many of those present in Ryle's list are not. This is not difficult to show, for if it is reasonable to use any of these words in a sentence that contains its purported opposite classification, without pain of contradiction, then we do not have an intelligence epithet: If 'x' is claimed to be an intelligence epithet and yet can be used to express acts or be descriptive of persons that are unintelligent, then 'x' cannot be an intelligence epithet. For example, it is possible to be intelligent but careless (one of Ryle's epithets of unintelligence), or unintelligent but critical (one of Ryle's intelligence epithets). This also holds for such words in his lists as "observant," "experimental," "alert," "skillful," "inspired,," and "silly," "rash,"

"humorless," "unobservant," etc. Many of these words in the lists are indeed the epithets Ryle claims they are so that one could not be both unintelligent and clever, sensible, witty, and acute. Nor could one be intelligent and stupid, dull, dense, and simple.

The point in all this is that Ryle's assimilation of intelligence to know-how and, more importantly, the suggestion that "intelligent" is not only polymorphous but determinable, causes him to think, first, that abilities and liabilities and <u>their</u> epithets (which are not what occur on his lists) are also epithets of intelligence and, secondly, to mistake occasions in which intelligence or unintelligence happen to occur for their exemplaries: the "intelligence epithet" mentioned above, "careful" is often used to express a manner or fashion of acting that is associated with intelligent action, but, when it is so associated, marks the occasion in which such intelligence is exemplified. However, it is also often the case that "careful" is used to express the occasion for action that is marked by a general lack of intelligence. Hence, "careful" is not an intelligence epithet, only a term that may <u>or</u> may not express the <u>occasion</u> in which intelligence is exemplified. Ryle fails to see this for the reason that he seems to think that there are as many exemplaries of "intelligent" as there are occasions (i.e., "intelligent" is a determinable disposition), and because he thinks that the exercise of abilities and competences (knowing-how) is always an exercise of intelligence.

Interestingly, in two later papers Ryle provides us with what may be called an "adverbial" account, not of intelligence, but of thinking.[35]

> The notions of being pensive and having thoughts do not explain, but need to be explained via the notion of intelligently x-ing, where 'x' is not a verb of thinking.[36]

Sibley points out that, according to Ryle, "the mentality of activities resides in the adverbial element, not in the activity, or x-ing itself."[37] Ryle wishes to reject the view that thinking consists of a single ingredient or single activity and ironically uses the expedient of introducing an adverbial component in the verbs of thinking. Such verbs are adverbial and they denote ways or manners in which other activities are performed:

> This view that thinking is not itself an activity but the way or circumstances in which other activities are performed, he illustrates first by the tennis-player.
>
> The latter is certainly thinking while playing tennis. But this is to be construed adverbially; he is doing various things intelligently, with his wits about him, warily. Since the force of thinking is the force of these adverbs, thinking cannot occur on its own; one must be doing something to do it intelligently and warily, or stupidly and carelessly. "Thinking" means "with thought" as "hurrying" means "with speed."[38]

Whatever the right or wrong of this thesis it is curious that Ryle should not have seen that if "adverbial" verbs don't obtain their significance from the activity of x-ing but rather it is they that explain the activity, how much more so or more properly this may be said of concepts that have a truly adverbial significance (such as in the very example he gives, that of intelligence).

In other words, Ryle's claims about the verbs of thinking are such as to modify his earlier thesis that the significance of a dispositional concept is derivative from its corresponding verb or activity, or else it is indeterminate. We could easily substitute what he says about "adverbial" verbs with our thesis about the <u>adverb</u> "intelligently," and what it implies: that the intelligence of

activities resides in the adverbial element, not in the activity, or x-ing itself. (Not in the occasions but in the exemplaries which in this case are denoted by the adverb). So, despite his intent, we have no less an authority than Ryle himself to agree with our critique of Ryle's argument: that the concept of intelligence need be indeterminate because there is no corresponding verb form of the concept, and hence no unique activity or essential ingredient to intelligence.

[1]G. Ryle, The Concept of Mind (London: Hutchinson & Co., Ltd., 1949), pp. 25-61.

[2]Whether Ryle's treatment of "intelligence" as a species of "knowing how" may not itself be an illegitimate move every bit as serious as the assimilation of "knowing how" to "knowing that" is a question we will have to consider.

[3]This is an arguable point that requires further investigation.

[4]Op. cit., p. 28

[5]Ibid., p. 48 As we shall see this claim is not entirely consistent with the claim that intelligence is a determinable concept.

[6] Ibid., p. 28 and pp. 42ff

[7]Ibid., p. 25

[8]Ibid., p. 27

[9]Ibid., p. 48

[10]Ibid.

[11]Among other things that adverbs may do in the performance of their duty is to be expressive of a manner, fashion, or style of doing things.

[12]Op. cit., p. 125.

[13]Ibid., p. 18. Later we will show that the distinction between determinate and determinable disposition is overly-simplistic, as indeed the present discussion suggests at least a fourfold classification among dispositional concepts.

[14]Op. cit., p. 48

[15]We will show that the episode-qualifying use of "intelligence" is far more commonplace.

[16]Op. cit., p. 118

[17]Ibid.

[18]Ibid., p. 96

[19]Op. cit., p. 118.

[20]Ibid.

[21]T. R. Miles, "On Defining Intelligence," British Journal of Educational Psychology, 27 (1967), pp. 153-165.

[22]Ibid., p. 156..Ryle introduced the notion of a polymorphous concept in his contribution to a symposium of Thinking and Language at the joint session of the Aristotelian Society and the Mind Association in 1951.

[23]Ibid.

[24]The exemplaries of 'X is kind-hearted' are the particular occasions when he is kind to people." Ibid.

[25]Op. cit., p. 28.

[26]A. MacIntyre, "Purpose and Intelligent Action," Aristotelian Society Supplementary Volume XXXIV (1960), 80-81.

[27]Op. cit., pp. 25ff

[28]Ibid., pp. 28ff.

[29]Ibid., p. 131

[30]See L. Wittgenstein, The Blue and Brown Books, (New York: Harper & Row, 1958), pp. 101-102, 44-49; esp. 49:

> Can so and so swim across the river?...is only answered affirmatively by those who actually have swum across this river.

[31]Ibid., pp. 10247 (Note the word "can" is like "ability" in that it is sometimes used in connection with skills, and sometimes used in connection with capacities; in both cases it is an expression of possibility, only in the case of abilities it approaches probability.)

[32]See C. K. Grant, "Good At," Aristotelian Society Proceedings Supplementary Volume, XXXII (1958), pp. 173-94.

[33]Ibid., p. 177

[34]A. MacIntyre, op. cit., p. 81

[35]"Thinking and Reflecting," in The Human Agent, Royal Institute of Philosophy Lectures, Vol. I, 1966-67. "The Thinking of Thoughts," University of Saskatchewan University Lectures, No. 18, 1968.

[36]"Thinking and Reflecting," op. cit., pp. 216-17.

[37]"Ryle and Thinking," F. N. Sibley, in Ryle, A Collection of Critical Essays, O. P. Wood & G. Pitcher, Doubleday Anchor & Co. (1970), p. 79.

[38]Ibid., p. 78.

CHAPTER II

THE CRITERIA OF INTELLIGENCE

While there is no rigid and exact outline for the definition of terms in ordinary usage, an important distinction for us to observe, in our analysis, is one made by Ludwig Wittgenstein between symptoms and criteria. This distinction is itself anything but exact, but this does not warrant the hopeless muddle made of it in the literature. Hopefully, we will be able to get our bearings more or less by fixing on this distinction, and engaging it in helping us to develop criteria of intelligence and their relationship to symptoms of intelligence-- where they overlap and where they are definitely separable.

In The Blue and Brown Books, L. Wittgenstein says:

> Let us introduce two antithetical terms in order to avoid certain elementary confusions: To the question, "How do you know that so-and-so is the case?" we sometimes answer by giving "criteria" and sometimes by giving "symptoms." If medical science calls angina an inflamation caused by a particular bacillus, and we ask in a particular case "Why do you say this man has got angina?" Then the answer "I have found the bacillus so-and-so in his blood," gives us the criterion, or what we may call the defining criterion of angina. If on the other hand the answer was, "His throat is inflamed," this might give us a symptom of angina. I call "symptoms" a phenomenon of which experience has taught us that it coincided, in some way or other, with the phenomenon which is our defining criterion. Then to say "A man has angina if this bacillus is found in him" is a tautology or it is a loose way of stating the definition of "angina." But to say "A man has angina whenever he has an inflamed throat" is to make a

hypothesis.[39]

Further on Wittgenstein demonstrates his awareness of the inexactitude or the difficulty of distinguishing between criteria and symptoms in specific instances:

> In practice, if you were asked which phenomenon is the defining criterion and which is the symptom, you would in most cases be unable to answer this question except by making an arbitrary decision ad hoc. It may be practical to define a word by taking one phenomenon as the defining criterion, but we shall easily be persuaded to define the word by means of what, according to our first use was a symptom...remember that in general we don't use language according to strict rules...[40]

In his explication of the Wittgensteinian distinction, R. Albritton claims that Wittgenstein means to say that the defining criterion for a thing being so is a logically necessary and a logically sufficient condition of its being so.[41] This logically necessary and sufficient condition is such for the reason that men have "agreed" upon certain "conventions." As for symptoms they can only occur if there exist criteria for a thing being so:

> ...if there is no criterion by which I might judge that I myself have a toothache, for example, then it will follow that nothing can be a symptom for me of having one.[42]

It is not that in order for there to be symptoms there must be some phenomenon which is the criterion for a thing being so, for there may be symptoms where there is no single criterion. But there cannot be any symptoms if there are no criteria.[43]

Albritton's interpretation of Wittgenstein's dominant conception of a criterion in the Remarks on the Foundations of Mathematics and the Investigations is that:

> A criterion for a given thing's being so is something that can show the thing to be so and show by its absence that the thing is not so; it is something by which one may be justified in saying that the thing is so and by whose absence one may be justified in saying that the thing is not so. And a criterion for a thing's

> being so has this relation to the thing's being so not as a matter of fact, like what Wittgenstein calls a "symptom" of its being so, but as a matter of "logical" necessity. That is, on Wittgenstein's account of such necessity, its relation to the thing's being so is "founded on a definition" or "founded on convention" or is a matter of "grammar".[44]

Albritton sounds a somewhat familiar note of skepticism in his concluding remarks. The question whether there can be any criteria in Wittgenstein's sense is doubted. He says that the set of propositions Wittgenstein would consider necessary and non-contingent, or contingent and not necessary, do not seem to him to be either necessary or contingent.

Albritton's interpretation of the Wittgensteinian distinction appears overly-stringent in light of what we know to be Wittgenstein's attitude toward the exactness of this distinction (see footnote #40), and Albritton's skepticism is more than likely to have been anticipated by Wittgenstein himself. Albritton's interpretation of the Wittgensteinian distinction between symptoms and criteria is of interest because it appears to be one to which Ryle subscribes, and by virtue of which he develops his notion of a polymorphous concept. The vagueness in which this concept is couched has already been remarked upon; however, we find an elucidation of what Ryle might have meant in J. O. Urmon's discussion: "Polymorphous Concepts,"[45] the critical portions of which closely resemble some of our own remarks on this topic. After considerable analysis Urmson draws the conclusion that Ryle uses two criteria for the polymorphousness of a concept:

> (1) No action-content must be a sufficient condition of its application;
> (2) No action-content must be a necessary condition of its application.[46]

By "action-content" Urmson means "that of which the action

consists." But Urmson goes on to point out that:

> A concept will clearly be polymorphous, formally, if some one or more of the necessary conditions other than action-content...are treated as being a necessary and sufficient condition of its application. If some feature other than action-content is a necessary and sufficient condition of the application of a concept, action-content will clearly be neither.[47]

Thus for example:

> ...it is a necessary and sufficient condition of misbehaving that the action-content, whatever it may be, should be something that ought not to be done. It is a necessary and sufficient condition of copying that one should act with the intention of producing a copy, and an action-content may either be a case of copying or of mere incidental resemblance.[48]

Now, this analysis parallels our own criticism of the Rylean ambiguity with respect to the notion of indeterminate dispositions. Where Urmsom speaks of the failure of action-contents to serve as the necessary and sufficient conditions for the application of a concept, we have spoken of the occasions versus the exemplaries of a concept (conditions other than action-contents), verbal narrations versus adverbial narrations. Of course, Urmson is here dealing with a broader class of features of which ours is but a sub-class (style-setting features), but the force of his criticism is similar:

> It seems that Ryle's formal account of the polymorphous concept...is too wide for his purposes. There are too many significantly different ways in which a concept may satisfy the criteria for it to be very helpful to characterize thinking as a polymorphous concept. I have tried to offer a more specific account of the concept of thinking and incidentally for that of working...[49]

Another way in which we might put this is to say that Ryle views the Wittgensteinian symptoms-and- criteria distinction in essentially the manner of Albritton's interpretation. Hence he believes that if one can find no "action-contents" of a concept that serve as the necessary and sufficient conditions for the application

of a concept, then that concept must be polymorphous (which we have already noted seems indistinguishable in Ryle's thinking from an "indeterminate" concept). Thus due to an overly-stringent requirement for non-polymorphous concepts, which is what Urmson points out, Ryle considers too many concepts to be polymorphous. The focus is on "action-contents" or, as we have described it, on the verbal counterparts of action or dispositional concepts ignoring the all too many other ways that a concept may be given a more determinate characterization. Urmson offers several in addition to ours (that a dispositional concept may have reference to its adverbial counterparts and derive its significance from them):

> We have seen that the first of these two criteria will be satisfied if there is some other necessary condition such that it and the action-content are jointly sufficient for the application of the concept (as the cutting of branches) and a certain intention are separately necessary and jointly sufficient for the application of the concept of pruning. We have also seen that the first criterion will be satisfied if there is some condition other than action-content which is both a necessary and sufficient condition of the application of the concept (as the impropriety of behaviour is a necessary and sufficient condition of the application of the concept of misbehaving). The second criterion of the polymorphous is that no content shall be a necessary condition of the application of the concept. It is obvious that this criterion will be automatically satisfied whenever there is some condition other than action-content which is both a necessary and sufficient condition for the application of a concept.[50]

There is yet another way in which Ryle's criteria for the polymorphous may be satisfied, and this one is of considerable interest for our purposes in the analysis of the concept of intelligence:

> It may be that no action-content is sufficient because there is another necessary condition other than content for the application of the concept, and that no action-content is necessary because there is a set of different action-contents, related by family resemblance or in some similar way, each of which will be

> sufficient, jointly with the other necessary condition, for the application of the concept.[51]

But this possibility would require a less rigid but more complex formulation of the Wittgensteinian distinction than the one provided by Albritton and apparently subscribed to by Ryle. C. S. Chihara and J. A. Fodor address themselves to just this issue in an article called "Operationalism And Ordinary Language: A Critique of Wittgenstein".[52] The focus of their article is on a critique of the Wittgensteinian claim that "an 'inner process' stands in need of outward criteria" (PI, 580). But in passing we obtain a more closely reasoned interpretation of the nature of the connection that obtains between behavioral predicates and mental states as claimed by Wittgenstein. We also find some useful insights concerning the notion of a "concept-syndrome," although we will have to sever this notion from its connection with an inner process bias, and show that it is consistent with a behavioral orientation as per Wittgenstein.

Chihara and Fodor introduce their critique by saying:

> "Which form of logical behaviorism one holds depends on the nature of the logical connection one claims obtains. The strongest form maintains that statements about mental states are translatable into statements about behavior. Wittgenstein, we shall argue, adopts a weaker version."[53]

Contrary to such views of Wittgenstein as Albritton presents, Chihara and Fodor argue that the logical connection that holds between overt behavior and mental states is not that of simple entailment:

> "The ball going through the basket satisfies a <u>criterion</u> for scoring a field goal. Notice that though the relation between a criterion and that of which it is a criterion is a logical or conceptual one, the fact that the ball goes through the hoop does not entail that a field goal has been scored. First, the ball

> must be "in play" for it to be possible to score a field goal by tossing the ball through the basket. Second, even if the ball drops through the hoop when "in play," it need not follow that a field goal has been scored, for the rules of basketball do not cover all imaginable situations."[54]

So, says Wittgenstein, a sign "is in order-if, under normal circumstances it fulfills its purpose" (PI, § 87).

The distinction between symptoms and criteria, according to Chihara and Fodor, is that symptoms are discovered through experience or observation while criteria are given by the rules of the "language-game." Statements that express a symptom are not derivable from the rules, while a statement of the criteria are. To give a criterion "is to give a grammatical explanation about the word 'toothache' and, in this sense, an explanation concerning the meaning of the word 'toothache'." (BB, p.24): A symptom is a "phenomenon of which experience has taught us that it coincided, in some way or other, with the phenomenon which is our defining criterion" (BB,p.25):

> "One can now see that to claim that x is a criterion of y is not to claim that the presence, occurrence, existence, etc., of x is a necessary condition of the applicability of 'y', and it is not to claim that the presence, occurrence, etc., of x is a sufficient condition of y, although if x is a criterion of y, it may be the case that x is a necessary or a sufficient condition of y."[55]

On saying this the authors oppose Albritton's view that by "criterion' Wittgenstein means a logically necessary and a logically sufficient condition.

> "In summary, we can roughly and schematically characterize Wittgenstein's notion of criterion in the following way: x is a criterion of y in situations of type S if the very meaning or difinition of 'y' (or, as Wittgenstein might have put it, if the "grammatical" rules for the use of 'y') justify the claim that one recognize, see, detect, or determine the applicability of 'y' on the basis of x in normal situations of type S. Hence, if the above relation obtains between x and y, and if someone admits that x but denies y, the burden of proof is upon him to show that

> something is abnormal in the situation. In a normal situation, the problem of gathering evidence which justifies concluding y from x simply does not arise."[56]

According to Chihara and Fodor there is another justification of existential statements having nothing to do with either criteria or symptoms but which is a justification by an appeal to the simplicity, plausibility, and predictive adequacy of an explanatory system as a whole.[57] They are aware of the likely (and probably sufficient) rebuttal that Wittgenstein considers making scientific hypotheses and theories a different game from such language-games as describing an event and describing immediate experience, as well as the likely argument that even in scientific theorizing there may exist criteria and/or symptoms for existential claims. However, they argue in favor of exploring the possibility that this constitutes an alternative to Wittgenstein's analysis of ordinary language mental terms. Thus they pursue the possibility that:

> "...what we all learn in learning what such terms as "pain" and "dream" mean are not criterial connections which map these terms severally on to characteristic patterns of behavior. We may instead form complex conceptual connections which interrelate a wide variety of mental states... our success in accounting for the behavior on the basis of which mental predicates are applied might properly be thought of as supplying <u>evidence</u> for the existence of the mental process we postulate. It does so by attesting to the adequacy of the conceptual system in terms of which the processes are understood. The behavior would be, in that sense, analogous to the cloud-chamber track on the basis of which we detect the presence and motion of charged particles. Correspondingly, the conceptual system is analogous to the physical <u>theory</u> in which the properties of the particles are formulated."[58]

This means that we are to treat "mental states" or "mental processes" as "theoretical constructs." Several objections would throw doubt on the adequacy of this suggestion (aside from those already mentioned), chief of which would be that <u>there is no such "theory</u>."

That is, mental predicates are not related to each other and to behavioral predicates in such a way (that is formally) that they constitute a theoretical system wherein the behavioral predicates are "deducible" from the "mental postulates," such that the questions of "simplicity, plausibility and predictive adequacy of the explanatory system as a whole" would arise.

Secondly, reports of mental states are not generally taken to be "theoretical" explanations of behavior, but are themselves taken to be "factual" reports which may be in need of explanation. It is true that certain mental predicates function as "explanations" for some sorts of behavior, as do motives for actions, but this (as has so often been pointed out in the literature) is a different sense of "explanation" than the sense in which the motion of charged particles (the theoretical constructs) explain the occurrence of the cloud-chamber track.

An example provided in support of Chihara and Fodor's view is that of the relationship between the EEG and the dream report. But their interpretation of this relationship evinces (as we shall show) a confusion about an actual <u>theory</u>, and mental discourse, and their erroneous connecting-up of this theory and mental discourse, with an "inner process" thesis as understood by these authors.

> "The relation between, say, EEG and dream reports is clearly not criterial; no one holds that EEG is a criterion of dream reports. It would seem then that, on Wittgenstein's view, EEG provides us with, at best, a symptom of positive dream reports; and symptoms are supposedly discovered by observing co-occurrences. The difficulty, however, is that this makes it unclear how the expectation that such a correlation must obtain could have been a rational expectation even <u>before</u> the correlation was experimentally confirmed."[59]

Chihara and Fodor conclude correctly that by a Wittgen-

steinian analysis the EEG would have to be viewed as a correlate of dream reports and not as a criterion (although it is possible that a correlate might come to be used as a criterion-say in future research-as Wittgenstein was fast to point out). Why this should be a difficulty with respect to the expectation that such a correlation might obtain before experimental confirmation is obtained is itself unclear. They argue that the reasonable explanation for the anticipated correlation is that the dream report is taken as an indicator of a psychological event occurring prior to it. Psychological events and cortical events are taken to be correlated, and this together with theory of the EEG permits the prediction that the EEG will provide an index of the occurrence of dreams.[60] While the general thrust of this argument is to show that "an 'outer' syndrome stands in need of an inner process," where "inner process" means a mental process in the dualist sense (but re-interpreted as a theoretical construct), what has been said hardly justifies the conclusion drawn. In the first place, by their own admission, the entire procedure of identifying the EEG with dream reports is a consequence of a series of correlations, and thus would be consistent with and not at odds with the Wittgensteinian thesis that the EEG is a symptom, a correlate of the criteria for 'dreaming' (one of which is a dream report). They must further believe that some event (the psychological event of dreaming) is a criterion of dreaming as well, so that their analysis does not seem to proceed without the Wittgensteinian distinction between symptoms and criteria. Their differences with the Wittgensteinian analysis does not seem to be the purported basis for justifiably employing a term, but rather what the exact nature of the criteria are: whether they are 'psychological' or behavioral. In this

respect, the claim that it is only through a correlation with a psychological event, that the expectation that the EEG will correlate with dream reports can be held to be rational, is gratuitous. Is anything lost to the theory of the EEG if the further step of "correlating" cortical events with psychological events is left out? There is no need, within the context of the neuro-psychological theory of the EEG, to take a dream to be anything other than a cortical event. This quite readily leads to the rational expectation that the EEG will correlate with dream reports-prior to experimental confirmation-without recourse to a "psychological" inner process. The theory may require an inner process, but this process is only neurological, not something psychological as well, to which it must be correlated (how would this correlation take place anyway?). To add on a psychological "correlate" is not to serve the interests of theoretical simplicity, nor does it contribute to the "plausibility and predictive adequacy" of the explanatory system employed. It is excess baggage and unnecessary.

Within a theoretical context, the EEG is "associated" with the occurrence of neurological events (it is not correlated), and it is then predicted that the correlation of the EEG with dream reports will take place. That is, there is a theoretical connection between neurological events and EEG, and if dreams are, within the theory ("in play") interpreted as cortical events of a certain kind (the criterion), then there is a natural deduction to the correlation of dream reports with the EEG in the case that dream-reports are taken, within the theory, to be, unlike the EEG, symptomatic of the occurrence of special cortical events. The nature of these connections in ordinary language could be and seem to be, quite different. The

dream-report may very well function, on the ordinary language-level, as a criterion not a symptom of 'dreaming,' and here the EEG would function as a genuine symptom, a correlate of one of the criteria for dreaming, whereas theoretically its connection with dreaming seems stronger.

As for the "mystery" of anticipating the correlation between the EEG and the dream report, it is no more a mystery than any other theoretical prediction. It could easily have been mistaken. It was a guess predicated on theory, which, if disconfirmed, would have altered or overthrown the theoretical connection between central events and the EEG.

The all-important lapse in Chihara and Fodor's analysis is the failure to note the differing contexts within which criteria and symptoms may function-what is a criterion in one context may not be counted as such in another context. The authors note this in their interpretation of Wittgenstein's notion of 'criterion' ("x is a criterion of y in situation type S") but fail to make a use of it in their critique. What they do is shift from one context to another: from the ordinary-language context to the context of scientific theorizing. Now it may well be that in ordinary language analogous shifts from criterion to symptom and from symptom to criterion occur (it is notorious in science), but this in no way vitiates the Wittgensteinian analysis.

On the other hand, the notion that a mental concept may be comprised of a complex of inter-related notions which Chihara and Fodor call a syndrome need not be denied but may be insisted upon provided we understand by this not a form of justification that

appeals neither to criteria nor observed correlations but rather that the syndrome is a complex of phenomena taken as criteria and correlations, which, in different contexts, function sometimes as criteria, and sometimes as symptoms, and sometimes as neither one nor the other. The important point here is that there can be many criteria (not just one criterion) of a concept, different ones in different contexts. Thus we can often find statements of the kinds:

i. If x, then C_1, or C_2 or ...
ii. If C_1 and C_2 and ...then x even when we cannot find any of the tradtional forms
iii. If x, then C_{n61}
iv. If C_n, then x

The distinction between criteria and symptoms while it is clear enough in general terms, may become somewhat fuzzy in actual practice. What may be called a symptom at one time may become a criterion at another time (especially in scientific investigation). Different criteria may be operative in different circumstances when we call a thing x (when we use different paradigms of x, say). Symptoms and criteria may overlap when a symptom is used as a criterion, or when a criterion is used as a symptom, in circumstances other than the ordinary. So that the question "What are the symptoms of x?" is relative to the circumstances or the context in which "x" is being used.

All of this is related to another acute observation of Wittgenstein's (on a general level) which fails in the expression of its details: the notion of "family resemblance" by which we classify things or objects. This view is that classificiation is the result, not of the satisfaction of a fixed set of necessary and sufficient

conditions, but of perceiving similarities among the objects classified:

> Why do we call something a "number"? Well, perhaps because it has a direct relationship with several things that have hitherto been called numbers; and this can be said to give it an indirect relationship to other things we call the same name. And we extend our concept of numbers as in spinning a thread we twist fibre on fibre. And the strength of the thread does not reside in the fact that some one fibre runs through the whole length, but in the overlapping of many fibres.
>
> But if someone wished to say: "There is something common to all these constructions--namely the disjunction of all their common properties"--I should reply: "Now you are only playing with words." One might as well say "something runs through the whole thread--namely the continuous overlapping of those fibres."[62]

Keith Gunderson in criticism of this view says that:

> ...it is hard to suppress the uneasy feeling that [Wittgenstein's remarks] leave us playing with metaphors. Instead of an alternative theory to replace the discredited one we are told that we group things under a common description (say, "is a game" or "is a number") on the basis of family resemblances. But how is this really very different from saying we do in fact recognize a variety of things or objects as being of a certain sort on the basis of their resemblance to one another.[63]

Gunderson also notes that one of the reasons why reliance on a simple analytic account of the ability to recognize certain specified kinds is unsatisfactory (and it is this problem that provoked Wittgenstein) is:

> ...that human recognition does occur within a context which very often plays a crucial role in determining how something is recognized as being a certain sort of thing. So it seems strategically necessary to take such features into account at the outset. For example, given the second letters in CATS AND DOGS it hardly matters whether the appex is closed since the context will disperse all doubt as to whether an open apex A were an H or not an A. Here it is obvious that our ability to recognize an ambiguous inscription as being an A and not an H is partially determined by context. The importance of this example is not that it shows that the closed apex is not a necessary feature of A's, but that it shows that contextual features enter into the set of conditions sufficient for distinguishing A's from other letters in general.[64]

What we are here suggesting is that Chihara and Fodors's understanding of the Wittgensteinian analysis of criteria together with their notion of a syndrome (understood somewhat differently as a criteriological/symptomological syndrome) will lead the way satisfactorily out of the jungle of "family resemblances" and the vagueness of "criteria" and "symptoms," to help provide us with not only the criteria (soon to be explicated) of intelligence but allow for an accounting of the concept within appropriate contextual boundaries.

[39]L. Wittgenstein, op. cit., pp. 24-25.

[40]Ibid., p. 25.

[41]R. Albritton, "On Wittgenstein's Use of the Term 'Criterion,' "The Journal of Philosophy, Vol. LVI, 22 (1959), p. 848.

[42]Ibid., p. 849.

[43]Ibid., p. 854.

[44]Ibid., p. 854.

[45]Ryle: A Collection of Critical Essays, O. P. Wood, & G. Pitcher, Doubleday Anchor (1970).

[46]Ibid., p. 258.

[47]Ibid., p. 257.

[48]Ibid., p. 247.

[49]Ibid., p. 265.

50Ibid., p. 260.

[51]Ibid., p. 261.

[52]Wittgenstein: The Philosophical Investigations, A Collection of Critical Essays, edited by George Pitcher, University of Notre Dame Press, pp. 308-419.

[53]Ibid., p. 387.

[54]Ibid., 391.

[55]Ibid., pp. 393-394.

[56]Ibid., p. 397.

[57]Ibid., p. 411.

[58]Ibid., 413.

[59]Ibid., p. 408.

[60]Ibid., p. 411

[61]M. Scriven, "The Logic of Criteria," in The Journal of Philosophy, Vol. LVI (22), 1959.

[62]L. Wittgenstein, Philosophical Investigations (67), Tr. by G. E. M. Anscome, Macmillan, 1969.

[63]"Philosophy and Computer Simulation," in Ryle, op. cit., p. 318.

[64]Ibid., p. 322.

CHAPTER III

IN SEARCH OF A DEFINITION

Holloway's Analysis

John Holloway carries the analysis of intelligence several steps beyond the Rylean analysis while still adhering to some of its more salient themes.[65]

Like Pyle he is critical of the "intellectualist legend" in a discussion that is meant to elucidate "how intelligent acts originate." He is interested in a causal account of intelligent behavior not in the sense of a scientific investigation into causes (which he admits to be a possible pursuit) but in the sense in which we may expect the plain man to seek out causes.

He believes that ordinary (and non-scientific) causal enquiry is pursued for the purpose of control (rather than "abstract classification and increased knowledge"). The search is not for necessary and sufficient conditions for the occurrence of events so much as a search for the regularities of a less stringent kind. This view sits well with Chinaia and Fodor's interpretation of Wittgenstein's conception ofcriteria and the task we here set ourselves of discovering such less stringent criteria of intelligence.

Now, when more strictly delineated requests are made such as "What is the initiating event which (given certain standing conditions) is a sufficient condition of the intelligent action in

question?"[66] some philosophers are prone to lapse into an adherence to the "intellectualist legend." This Holloway says is because intelligent actions are not instantiations of uniform regularities (laws), but rather tend to be deviations from a normal pattern (chance, instinct, habit). There does not occur a uniform pattern of events that we can say of them that this or that event(s) follows "of necessity" upon the heels of such and such initial conditions. Those philosophers who insist on the discovery of a universal regularity of events even when they are not to be located in the external order of events as observed, find them in the internal operations of the mind, and it is these "mythic" events that serve as the initial conditions for the occurrence of intelligent acts and what provides for the ascription of that act as such.

Holloway rejects this view of the origins of intelligence in much the same way and for the same reasons as does Ryle, and offers a solution to the problem of explaining intelligent acts that has a distinctly Rylean flavor.

According to Holloway, we ordinarily account for intelligent acts by reference to an observed regularity in the behavior of the agent, and point out that the action under consideration is but an instance of that regularity.[67] This class of regularities says Holloway belongs to the generic type "which constitutes an accomplishment or skill."[68] He adds as does Ryle that intelligence is operative within the context of purposive action, and that this is what is crucial in the distinction between what he calls generic intelligence or skill-predicates, and physical predicates like "brittle." He also provides us with a list similar to Ryle's "intelligence epithets"

which he considers to be words of more or less generality having reference to talents, accomplishments, or skills:

> "shrewd," "tactful," "dexterous," "musical," "artistic," humorous," "sure-footed," "judicious," "sensible," "resourceful," "charming," "kindly," "eloquent," "lucid," "deft," "agile," "persuasive," "reticent," "affable," "gentle"...[69]

--and a more general class of words:

> "versatile," "astute," "sharp," and "intelligent"; the most general term of all is perhaps "clever."[70]

The explanation of intelligence for Holloway has reference not to an unvarying or habitual responsiveness but to a responsiveness marked by the capacity for flexibility and adaption--the agent can be expected (once we ascribe some such word, as those listed, to him) to modify his reaction appropriately in most and even novel circumstances.

So far Holloway's analysis has not much to recommend it beyond Ryle's analysis, and many of the errors uncovered in the writings of the latter are repeated by the former. However in those chapters where he contrasts intelligence with other concepts we get some additional insight into what may be meant by this concept. The first of these contrasts Holloway makes is with the chance formation of habits as depicted in the psychological theories of J. B. Watson.[71]

It is by focusing on that stage of development where behavior has still not become habitual that Holloway thinks he can reveal some characteristics of habit formation that may not simply be the consequent result of re-enforced chance successes or unenforced chance failures, but rather the consequent result of intelligence: this is a point in time when an organism is confronted with a new situation, when it must solve a problem not encountered previously.

Holloway is critical of the view that we can explain how a child learns to open a box of candy irrespective of any reference to successful tries.

Watson's argument is that the child will make the proper move (among all possible moves) by chance. But with each successive try that move will become more frequent while the improper moves will tend toward extinction. The actions of a human child are no different from the random actions of a chicken fluttering aimlessly against a wire screen to get at food, or the random wanderings of a rat seeking escape from a maze, and only by chance going around the proper way to it. The initial successes in all these cases are obtained by chance.

While some of these examples of successful outcomes may be attributable to chance, Holloway wants to say that in many cases (the cases of the child and apes) we cannot account for the formation of habits without reference to the consequences of actions and whether or not they were successful. To support this contention he cites W. Kohler's now famous experiments on The Mentality of Apes (1925).

While a chicken appears to obtain a successful result through random hit-or-miss maneuvers, a dog placed behind the chicken wire seems to review the situation in one glance and then runs directly around the wire. Kohler's chimp, when confronted with bananas hung high up, eventually carried over some boxes and piled them up under the bananas, climbed up on them and from that height sprung up toward them and tore them down, where other chimps had given up.

This same genius among Kohler's apes (Sultan), when confronted with fruit placed too far outside the cage to reach, managed to take two short sticks of bamboo that could be fitted together, the one into the hollow of the other, and in a moment of

evident insight, proceeded to make a longer stick of the two short ones, and in a smooth integrated move scraped in the bananas, where the other chimps fruitlessly attempted to get at them with the short bamboos.

Holloway takes these experiments to be indicative of the fact that habits may be acquired in a manner other than Watson's initial success by chance:

> The growth of habits through chance success, through fumbling, can be cut short. In the case of the apes, this seemed to happen after some perception which was more complex than usual; not focused exclusively on the desired object, but embracing several objects as related parts of a whole, where actions which affected some parts would indirectly affect others....This sort of activity produces not only new habits but also makes us abandon old ones. But in these circumstances the old habit is abandoned in a way quite different from gradually lapsing through failure, it is suddenly, decisively discarded.[72]

This alternative type of initial problem-solving in human behavior Holloway refers to as intelligence.

The most telling criticism of Watson's thesis occurs towards the end of the chapter "Does Intelligence Exist?" Holloway makes the point that phrases like "by chance," "through insight," and of course "intelligent success" exist for the purpose of making an important distinction between, "for example, how dogs behave, and how chickens behave, when they see food through a wire screen, or between tying a new knot by luck and by a stroke of genius."[73] He argues that phrases like "by chance," "by luck," and "accidentally," when applied to human behavior are not meant to draw an analogy with the behavior of inanimate objects so much as to draw a contrast between different kinds of animate behavior. "Chance success" in this sense would be devoid of meaning if it did not stand in contrast to "intelligent success." The intriguing aspect of this argument is that it suggests

the possibility that "intelligence" may be what is left over by distillation once "chance," "instinct," and "habit," are ruled out as explanatory of attempted resolutions of a problem.

Another contrast Holloway is interested in investigating is that between a habitual response and an intelligent response.

We are told that there are two different senses of the word "habit" that correspond to two different senses of the word "intelligent."[74]

The first sense of "habit" is the sense of habit we refer to when we speak of blind habits which are rigid, automatic, and not properly adjusted to circumstances. Such habits are usually fallen into. The second sense of "habit" is a sense of "habit" which is flexibly adjustable to varying circumstances. Such habits are deliberately acquired (for example, "making speeches which sum up discussions"). The former sense of "habit" is a sense that sharply breaks with intelligence, while the latter is compatible with intelligence and is never completely lacking in it.

The two senses of "intelligent" are the opposite sides of the coin of these two senses of "habit." One sense of "intelligent" is in direct opposition to the first sense of "habit" or stupid routine. The other sense of "intelligent" lies on a gradational line with habits so that there can be habit-dispositions that may themselves be characterized as more or less intelligent.[75] Thus "habit" and "intelligence" are not terms that refer to radically different types of behavior but different facets of a single range of behavior.

Intelligence is exhibited when habits are extended and adapted to novel situations that are in some way recognized as analogous to past situations, as when such ingrained habits are

withheld from execution due to the agent's sensitivity to some difference in the present situation. But to distinguish intelligent from unintelligent behavior a criterion of intelligence is needed.

Holloway claims that two generally different types of criteria are usually given. The first of these is that intelligence in any given action is recognized if this action is only one instance of a general competence to solve problems of that sort. The criterion of intelligence is a criterion of competence or ability: the agent must demonstrate his ability to bring cognate tasks to a successful conclusion, to make improvements upon his performance, to make useful criticism of his and other performances of that kind, to instruct others by the proper application of elicited principles, and so on.

The second criterion often alluded to is that intelligent action is recognized as such only if it is found to be dependent on the occurrence of specific mental events. Intelligent behavior proceeds with "insight" and "understanding," and we are to understand such words as having reference to the introspectible states of the mind.

Holloway argues against the adequacy of the latter criterion. Introspective reports are often deceptive he says, and would thus render a judgement based on such psychological evidence inconclusive. We would still have to match the report against the action, independently gauged to be intelligent or unintelligent. Furthermore one need not have any assurances that there were any such mental experiences accompanying an act in order for the act to be demonstrably intelligent. So that while the psychological criterion may sometimes be used as an indirect gauge of intelligence it is itself gauged by reference to the performance criterion. If the

psychological data and the performance give contradictory results, the psychological criterion is subordinated and rejected as misleading.

Holloway admits to the circularity of the performance criterion but does not consider this to be important. The reason for this he argues is that the whole point of the performance criterion is to exclude the judgement that the action was a consequent result of blind routine or chance.[76] Competence in a variety of related tasks is sufficient evidence to exclude such possibilities, for our chief concern was to exclude them. The distinction that this criterion of intelligence means to establish is the distinction between those performances that are isolated and the result of a blind and inflexible routine or the result of chance, and those performances that form a part of an indefinite variety of similar actions in changing circumstances.

But what exactly is the "performance criterion of intelligence"?

> ...our guide to its presence [intelligence] in a given action is that the agent can show that this particular success does not stand alone, but is merely one instance of his general competence to solve a wide range of problems of this kind, novel or otherwise.[77]

The notion that is explicitly operativein this criterion is that if an indefinite group of activities (that form a related whole) produce successful results in each operation taken as an isolated part, then such activities, when considered together, mark a distinction between the members of that group, and any other activities that are thought of as merely random or blind routines.[78] Thus the case is made that this group of activities <u>is</u> different, and this difference we usually indicate by the use of the word "intelligent" whenever we make reference to any members of that group.

We need not have used this word but the distinction would still exist and would have to be admitted to irrespective of the words used to mark that distinction.

> We sometimes give a person credit for understanding a word in a foreign language, though he is unable to translate or use it...But we never believe this as an article of faith. We believe it (if we do at all) because although he cannot succeed in activities like translation, which are the usual index of understanding, he succeeds in others: for example, he is able to offer a series of possible translations, and reject them for what seem to us to be convincing reasons. If he were unable to exploit his understanding in any way,[79] we should decide that there was no substantial evidence of it.

It is enough to say that member routines of one group (the intelligent) do not belong to another type of routine (chance or blind routine) to mark them off as a distinctive type; and we justify such an ascription by predicting that the operator or agent is competent to perform successfully in related circumstances belonging to one type (intelligent) and not the other types (accident or habit).[80]

Holloway is cognizant of an objection that may be raised against this criterion, namely that the intelligence of an act is made dependent upon the performance of other acts, each of which in turn is subject to the same query as to its intelligence. This stigmatizes the "performance criterion" as subject to a never-ending regress. It was this objection that forced a rejection of the "intellectualist legend," and provided a basis for finding the "psychological criterion" inadequate.

Holloway's response to this objection is a defense of the performance criterion as already cited (footnote #78). He admits that his defense reduces the argument to a circle, but he does not consider this to be serious, for the reason that the performance criterion is merely descriptive of a distinction that exists in fact and is

reflected in the language by a contrast between such phrases as "intelligent success" on the one side, and "by luck" and "by blind routine" on the other.

Nevertheless, whenever we are confronted with an action A (be it successful or not), it is not at all clear from the performance criterion how we are to tell whether it is an activity that belongs to the general class of those actions called "intelligent" or not. The problem repeats itself with each purported cognate activity--B, C, D...N. What is the mark by which we are to recognize each of these actions in turn, as belonging to the general class of intelligent actions, or for that matter, that they are indeed cognate activities? No answer to these questions is forthcoming.[81]

On the one hand, it appears to be "cognate activities" in the sense of activities that are similar to but different from A. So, for example, if A is a procedure for obtaining an arithmetic sum, then presumably procedures for obtaining a difference, a product, a quotient, and so on, as solutions to arithmetical problems are cognate activities: B, C, D...N. On the other hand, Holloway talks not only of cognate activities in the above sense but also of such activities as eliciting principles, instructing others how to proceed, being critical and improving upon a procedure (in a manner reminiscent of Ryle):

> We present him with cognate difficulties, ask him to improve on what he has done already, or comment upon it, or elicit its principles, or train other people, or describe different ways of failing to solve the problem, or whatever else it may be. In brief, the criterion of intelligence refers only to the performance abilities of the agent.[82]

Does he wish to consider the former as criteria, the latter, both, or sometimes one and sometimes the other? Once again no

answer to these questions is forthcoming. Indeed there seems to be no realization that these "criteria" are different, and that in either case there appear to be insurmountable objections.

What Holloway seems to be working toward is a "formalization" of the behavioral basis for ascribing intelligence to an agent that is already subscribed to by Ryle. But whatever is wanting in Ryle's analysis is repeated in Holloway's, especially the assimilation of intelligence to performance abilities (knowing-how). Thus, the first set of criteria ("cognate activities") would surely be inadequate (by itself). The simplest "adding" machines on the market will satisfy the performance criterion in that case, and this would be the most obvious travesty of ordinary usage imaginable, not a faithful rendition of the distinctions that already exist in fact and in language. No criterion of intelligence can be adequate that forces us to conclude that a pocket calculator is intelligent. The automatic calculator does not succeed by mere chance, nor by blind habit, but neither is it intelligent for all that.

The alternative list of activities appears to be more promising as a set of intelligence confirming performances, but we lack anything akin to a demonstration that the necessary and sufficient conditions for calling an act intelligent are that the agent either elicits principles, or instructs others how to proceed, or is critical, or improves upon a procedure, or does all these things in combination.

Perhaps (as we have so often noted) that would be too strong a requirement to ask for, so we might settle for a demonstration that these or at least one or more of these activities

can be pursued by anyone performing action A. However, not even such a loosened requirement will work to support this list as a criterion of intelligence. We can all of us think of many counter-examples wherein the inability to pursue such activities is no evidence that would cause us to withdraw the ascription of an intelligent performance from the agent.

Consider the case of the Welsh farmer, who from a time too distant for him to recall, had learnt how to pick mushrooms of the edible variety. He is able in the gathering of the best of those mushrooms in the field; where to seek them out, the times appropriate for their discovery, and the studious avoidance of the poisonous variety. He excels in mushroom gathering. However, if he is asked to provide us with a rule of thumb for distinguishing the edible sort from the poisonous sort (that is, to elicit a principle) he says that "the edible mushrooms are the large, dark beauties" and "the poisonous mushrooms are the large, dark nasty ones." Asked to show us how to pick them (to instruct others), he proceeds to gather them, and leaves us to our own devices (presumably to learn by imitation).[83] It is of course out of the question to expect an ongoing self-conscious critique of his procedure, or an improvement on an already excellent operation.

Is this "blind habit"? Is it a "stupid routine"? No, it is (our linguistic intuitions" inform us) an intelligent performance, and yet it is one that would be condemned as unintelligent by the application of the second set of criteria alone.

Now it may be objected that nonetheless the first set of criteria would pronounce the Welsh farmer intelligent since he exhibited an ability to perform a series of cognate skills. However,

this would beg the question since the first set of criteria has already been shown to be inadequate as a criterion of intelligence, and now the second set has fared no better. The first set requires us to call what is not intelligent intelligent, and the second set requires us to call what is intelligent unintelligent. Thus both of the lists of criteria Holloway provides us with as comprising the performance criterion of intelligence fail as the confirming or disconfirming activities of an intelligent performance. Actually these problems may well have been anticipated since "the performance criterion" is no more than Holloway's attempt to crystallize Ryle's intuitions on this subject. The "cognate activities" portion of the "performance criterion" is Ryle's assimilation of intelligence to knowing-how in formal clothing, and the second list of criteria is a mere repetition of Ryle's description of the intelligent, articulate agent, which needs be too narrow since there exist inarticulate, indeed non-language using, intelligent agents.

Intelligent Success and Chance Success

We often contrast the results of intelligence with the results of a lucky stroke or chance. The contrast (as Holloway points out) is not between the animate and the inanimate but between the (usual and unusual) successful outcomes of the actions of animate things. The difference between them seems to lie not in the fact that the result was successful (since in both cases they are) but in the manner of arriving at the successful outcome.

This may be brought out more sharply if we consider that we often will say that an act although it was unsuccessful was still intelligently executed (some facts might have been mis-perceived for

example) and may very well be compared with another act which although it succeeded was executed in a random fashion.

Which of the various possible descriptions of an intelligent act is relevant to this contrast? We may discover this property or properties by considering the methods employed for the discovery of whether or not a given act is "accidental" or intelligent.

One such test is that of repetition: we require that the agent demonstrate his capacity to bring things off when presented either with the same or similar problems.

If a chicken is placed behind a wire screen with but one route to food, and it immediately and directly moves to the food, we may be surprised at its cleverness as far as chickens go. But we will first want to rule out the possibility of chance success (of course we assume the situation to be entirely novel for the bird) by repeating the experiment.

If now the chicken flutters aimlessly until it reaches the food we will revoke our judgement of how clever this chicken is, and attribute its initial success to a lucky stroke. We might repeat this experiment several times to rule out some obstructive factor in the second trial, and we will vary the situation to rule out the effects of conditioning.

If a dog is placed in similar circumstances and he immediately moves to the food he too will be judged to have a modicum of intelligence, and if unlike the chicken he continues to accomplish this feat over several trials, and in varying circumstances, we would have to rule out chance as a basis for success. Note however that if we rule out success by a lucky stroke that it would still be too soon

to make the assumption that success was due to intelligence. We may yet have to rule out other possibilities as a basis for a successful result before we conclude properly that it is a consequence of intelligence and not say the consequent result of operant conditioning, reflex, or instinct. Nonetheless it is repetition in the same or similar problem-solving situation which is crucial to the determination of chance success. We may judge an act to be the result of a lucky stroke, or we may rule out that possibility. If it is the former then the act was not intelligent. If it is the latter we are not yet in a position to say that it was intelligent.

Intelligence, Reflexes, and Tropisms

If a dog were taken into an environment populated by dangerous crawling creatures (snakes, scorpions and the like) with an uneven terrain (tall blades of grass), he will be seen to turn in a circle several times before sitting or lying down.

The test of repetition that was previously required to rule out chance behavior will easily be passed by this canine performance, and we may be strongly tempted to conclude that this is an instance of intelligence--a tendency on the part of the dog to take a "precautionary measure against snakes and the like and to flatten out a bed."[84]

If, to take another case, an agent were to persistently (and successfully) seek out an object essential to its survival and development, and this in the face of different obstructions placed in its way, then such an agent would not only pass the test of repetition, but would once again be a case sorely tempting the attribution of intelligence.

It turns out that this is the "practice" of most varieties

of plants which in their growth seek to turn their leaves toward a source of light (the sun) and so orient themselves as to avoid the existence of any obstruction in their way.

Sunlight is an essential part of the photosynthetic process whereby the plant manufactures its "food." The accuracy with which such plants use their tendrils to seek out a light source is what provokes amazement in us. Although chance has been ruled out as a basis for either one of these actions, the inference to intelligence would be far too hasty no matter how striking the examples.

The first case (Darwin, Expressions of Emotion in Man and Animals (1812) is a "vestigial" behavior pattern left over in the dog by his evolutionary ancestors. It is reflexive (if not instinctive)[85] and may be distinguished from an intelligent response by the fact (another test) that it is resorted to irrespective of the conditions in which the dog finds itself.

In an environment where there are no dangerous crawling creatures and no obstructions (a bare wooden floor let us say), the canine disposition to turn in circles, before sitting down, persists unabated. This demonstrates a boundedness to some stimulus (i)--internal or external--that the dog appears unable to overcome. His behavior is a direct and immediate motor response to a stimulus (preformed and automatic).

The second example is one of positive phototropism and may be determined to be unlike intelligence in the same way as is a reflex. The mechanical and irresistible movement of the leaves and tendrils toward the sunlight is stimulated directly by the play of such light on the plant. In the absence of sunlight or reasonable facsimile thereof (special "sunlamps") the tropism does not take

place, nor does it take place if the rays of light are too much different from those of the sun.

Animals also display tropisms: a butterfly will move with greater drive toward a stronger than toward a weaker source of light. This might be helpful to a butterfly if it is trapped within a dark enclosure and needs to secure a passage for escape. On the other hand, the phototropic response may very well be mal-adaptive in other circumstances: the flight of a moth directly into a flame ends in death. The moth, however, cannot resist (something we might expect in intelligent behavior) doing what is triggered in its neurophysiological structure by such an external stimulus.

The difference between a reflex and a tropism is that while a reflex is generally thought of as the response of a limb or muscle in isolation, a tropism is a response of the entire animal (or plant). Both are automatic "unthinking" responses to specific and identifiable stimuli and are hence distinguishable from intelligent responses in that they proceed without flexibility even in those circumstances where the action is not required, and where it is positively harmful.

A more complex response that incorporates a variety of reflexes and/or tropisms would be called an instinct, and this too needs to be contrasted with intelligence.

Intelligence and Instincts

The instinctual behavior of animals, especially of the insects, displays such an intricate and precise adjustment of means to ends, and is so marvelously adapted to circumstances as to never cease to amaze us.

Instincts have often been mistaken for the intricate and precise behavior evident in well thought out plans of action--that is,

for intelligently designed adjustments of means to ends. The concept of an instinct therefore affords us the most telling of contrasts for setting off intelligence as a unique style or manner of proceeding.

Instincts are generally taken to be inborn, preformed automatic responses to specific external stimuli, and are contrasted with any overt behavior that results as a consequence of learning or training, although it may become modified by environmental and developmental factors.

Instinctual responses are more "complex" than those of a simple reflex. They are composed of a series of actions (each of which may be reflexive) that form a rigid chain. These responses follow one upon another under the influence of certain external conditions that are present at each stage of a total routine; if such conditions fail to be present, the performance will not run its course.

A description of this style of proceeding will invariably make note of the fact that it is directed toward a recognizable end, but that the animal pursuing the course of action seems not to be cognizant of this objective--it is "blind" to the outcome of its activities.

The rigidity of such routines together with an inability to adjust varying circumstances, while maintaining a constancy of objective, serves to delineate the instinctual style of proceeding from the intelligent one. However, whenever an organism is so constructed as to display a large number of reflexes, tropisms and complex wired-in responses, amenable to some modification either by accident or primitive learning, the propensity to judge such acts as it performs, intelligent, becomes more and more difficult to avoid. For this reason it is important that we be able to set up tests that

serve to mark off the distinction:

> ...a caterpillar, when it is about to pupate, spins a cocoon...an edifice that, when analyzed is a masterpiece of engineering...the caterpillar displays the completely automatic nature of its performance if it is interrupted in the middle of its task and the half-finished cocoon removed; it does not start again from the beginning, but spins only what remained for it to do, in spite of the fact that the resulting half cocoon is completely useless for protection.[86]

The complex routines which we call instincts are subdivided into smaller units each of which are themselves sub-routines which are "wired-in". Each sub-routine unwinds when triggered by a prescribed and specific stimulus (usually the completion of the previous routine):

> When the time comes for egg laying, the wasp sphex builds a burrow for the purpose and seeks out a cricket which she stings in such a way as to paralyze but not kill it. She drags the cricket into the burrow, lays her eggs alongside, closes the burrow, then flies away, never to return. In due course, the eggs hatch and the wasp grubs feed off the paralyzed cricket, which has not decayed.....
> .....some triggering mechanism, perhaps the psychological state of the female, sets in motion the series of subroutines associated with the preparing of a nest and the laying of eggs. The first sub-routine called forth is the preparation of a burrow. The completion of this subroutine is the trigger for the next, which consists in the searching down of a particular species of cricket and paralyzing it. This in turn is the trigger for the next act in the drama, bringing the cricket to the threshold of the burrow. The presence of the cricket at the threshold of the burrow is the signal for the wasp to go inside for a last check around. Emergence from the burrow and finding the paralyzed cricket at the threshold is the signal for pulling the cricket into the burrow, and so on.[87]

What tests show this is a series of automatic sub-routines and not simply various steps in a wellexecuted, intelligent plan of action?

> If, while the wasp is inside (the burrow) making her preliminary inspection, the cricket is moved a few inches away, the wasp, on emerging from the burrow, will bring the cricket back to the threshold, but not inside, and will then repeat the preparatory procedure of entering the burrow to see if everything is all right.... The wasp never thinks of pulling the cricket straight in. On one occasion, this procedure was repeated forty times, always with the same result.[88]

While those behavior patterns we call reflexes, tropisms, and instincts like intelligence are distinguishable in their performances from chance success, in that they can be repeated, they are unlike intelligent behavior in the automatic character of their responses, and in the rigid "wired-in" structure of their proceeding (sequential and stimulus bound).

Instincts, despite their complexity which contributes to the "illusion" that they are intelligent performances, display a greater constancy toward their performance irrespective of the goal they are "meant" to accomplish than to that goal.

Intelligent acts as we shall see display a flexibility of routine, for they display a greater constancy with respect to the goal than to the means for achieving that goal.

Intelligence and Learning

Learning is often associated with intelligence as indicative of its presence. However, we must distinguish two forms of learning (=purposive--adapted behavior that is acquired):

1. That which is learned by trial-and-error or drill, and
2. That which is acquired by practice but which is always at the ready for modification should circumstances warrant it.

The first of these is usually referred to in the psychological literature as "conditioning" and in ordinary parlance as "habit." The second of these is usually referred to as "insightful" learning and it is this form of learning that is considered to be concomitant with intelligence. Both of these forms of learning are distinguishable from that other type of purpose-adapted behavior (which is not acquired but genetically determined) which we have just discussed, that is, instinct.

Intelligence and Habit

The first of these learning forms where it occurs untutored (without the deliberate imposition of repetitions), proceeds by trial-and-error in a fumbling and random fashion until a specific course of conduct is re-enforced by the repeated satisfaction of a biological drive (goal). It is therefore a form of behavior acquisition that occurs in even the most primitive forms of life.

The example of the chicken attempting to get at food from behind a wire screen is typical of this form of behavior acquisition. After a period of aimless fluttering and wandering about, the chicken will by sheer accident arrive at its desired destination. As the experiment is repeated many of the random motions are eliminated, and at some later time the chicken will move directly and without wasted motion toward its food goal. At this point the "correct" response will have become conditioned, a habitual response of the chicken.

The initial stages in the development of this habit were marked by flexibility and fluidity, in fact to the point of sheer randomness. By the time the habit was inculcated it displayed a rigidity equally as "blind" as the random behavior it started with. If no food were present where it was previously placed, the chicken would nonetheless continue, in repeated tries, to move in that direction until after a long time the habit would be broken.

This manner of learning is by no means confined to lower forms of life for it is a feature of learning even among the more intelligent species including man himself wherein the deliberate inculcation of habits goes by the name of drill. This form of learning is usually contrasted with intelligence for much the same reason as is

the unlearned responses of an organism, it is an inflexible, rigid procedure for obtaining an objective in its final stages, while in its initial stages it is uncoordinated and overly flexible. In both its initial and final stages it is "blind" to the relationship between means and ends.

Gilbert Ryle in discussing the contrast between habits and intelligent performances makes precisely these observations when he says that habits are automatic and may be executed without the agent thinking what he is doing.

Intelligence and Training

It is here too that Ryle says that intelligence is developed by training, which he describes as "the stimulation by criticism and example of the pupil's judgement." But what distinguishes this form of learning from the former according to Ryle is that performances that stem from training are innovative and require that the agent think what he is doing. Performances that stem from training are modified by previous practice, and are often marked by novelty.

Nowell-Smith, in a symposium meant to elucidate the relationship between "intelligence" and "purpose,"[89] makes much of the connection between learning and intelligence. In one of his opening remarks he tells us that if any one thing should be considered of the essence of intelligence that thing should be the ability to learn.[90] However, this is later modified by Nowell-Smith so that the ability to learn is not connected to intelligence by logical necessity, and is referred to as being "deeply embedded" in the concept.[91]

The introduction of the ability to learn as an essential characteristic of intelligence by Nowell-Smith appears to be motivated by a desire to say some things about the way psychologists treat the

concept of intelligence. Learning is seen to be important in his analysis because it has a bearing on the issue of what intelligence tests are purported to be tests of.

He believes that confusion over this issue is due to the fact that some psychologists believe it to be impossible to test for inborn or innate intelligence because they do not see how such a recondite trait could ever lend itself to observation. However, this mistake is committed by emphasizing the fact that in the giving of an IQ test psychologists deal with specially chosen samples of people's efficiency in thinking and behaving; in other words, they deal with acquired traits. But, says Nowell-Smith, the results of such tests of efficiency of performance indicate a child's ability to learn; and so what psychologists are trying to test for is not a child's present performance abilities (which they do indeed test) but an inborn capacity. This claim can be supported by the facts that: the test score is multiplied by mental age over chronological age, demonstrating not that present performance is at issue but how much has been acquired up to the present.

IQ tests are used as selection criteria for different types of schooling, and this shows that it is not what a student has accomplished but what the test indicates about his educability that is of interest. The desire to make tests "culture free" shows that what psychologists are seeking to test is something which is indifferent to cultural influences. Also, the fact that some of the principles by which tests are constructed are designed to eliminate differences of home background as much as possible shows how intent the psychologist is in getting at something un-acquired.

What some psychologists fail to recognize is that a capacity is not the sort of thing that can be directly observed. However, it can and ordinarily is assessed by direct observation of abilities.

What Nowell-Smith appears to be saying is that the ability to learn has an important but contingent relation to intelligence. It is not a criterion of intelligence in the strict sense, but serves as a handle for psychologists to get a grip on the problem of assessing the degrees of intelligence. Thus, we might say that Nowell-Smith is arguing that the ability (or better, capacity) to learn is symptomatic of the existence of intelligence, and it is a symptom that allows for a quantification of the concept. This would mean that the capacity to learn is not an analytic criterion, but an indicator of intelligence.[92] What is it about the capacity to learn that serves as an indicator of intelligence?

Learning (in the first sense) as conditioned response or habit formation has already been contrasted with intelligence so that this is not the sense of learning that serves as an indicator of intelligence, although it may very well serve as the primitive base for the acquisition of behavior on which the more complex pattern of behavior that results from training rests.

Such more complex patterns of behavior-acquisition are best described within the context of a problem-solving situation wherein a goal can be specified and the obstacles toward its obtainment varied so that the nature of the response may be observed.

Strictly speaking, it is not the acquisition of the behavioral pattern that we would be observing so much as the

consequent result of such learning--the behavior style whose contrast with the behavior styles of reflexes, tropisms, instincts, and even conditioned learning is quite marked.[93]

> In what animal researchers have called "oddity-principle learning" a monkey is allowed to "reach" through the bars of his cage at three "dish covers." After some trial-and-error reward--the equivalent of "instructions" in tests for humans--rhesus monkeys will "get the general idea" as Stone (1961) has shown, and henceforth choose the non-class dish cover (regardless of the particular symbol) in each new presentation.[94]

Unlike reflexive responses, instinctive ones, and conditioned ones, those responses that ensue from learning in this sense are far more susceptible to variations and changes in the behavioral environment. The desired objective is achieved despite rearrangements of the behavioral environment away from the usual pattern. The animal exhibits a style of proceeding that spontaneously modifies its conduct and adapts to the requirements of the situation even if this means inventing a new pattern of behavior for the achievement of the goal (as did Sultan in Kohler's experiments).

A description of this style of proceeding goes hand-in-hand with a description of that style of proceeding which we call intelligent. And it is at this point that the relationship between learning and intelligence comes to the fore.

IQ tests when they test for verbal abilities, numerical abilities, spatial abilities, inductive reasoning and so on, attempt to test (as Nowell-Smith claims) not so much for present abilities as the capacity (inborn) to learn, which such abilities indicate.

The testing of learned performances is the easiest way for us to get a handle on the general problem of testing for intelligence, for we can in this way test the effects of <u>instruction</u> on the

agent--whether the acquisition is rigid, automatic, or degenerative to trial -and-error, or whether the acquisition merely serves as a base for a flexible, innovative use of means for the achievement of a prescribed end. Thus while learning in the second sense is indicative of intelligence, the description of performances consequent to such learning is characteristically that style of proceeding which we call intelligent and which contrasts with reflexive and instinctive as well as habitual styles of proceeding.

A description of this style of proceeding contrasts at every point with some aspect of the previous styles of proceeding considered.

The characteristics of such a style of proceeding are best brought out (as in a description of the learning capacity) by the creation of a problem-solving situation wherein an obstruction is placed in the way of an agent's objective. It is this very same experimental situation that serves to detect instinctive or habitual responses and distinguish them from intelligent ones (such as Kohler's experiments with the chickens, dogs, and apes).

Kohler sums up these experiments by saying that:

a. An intelligent animal solves its problems suddenly after several unsuccessful tries, unlike the unintelligent animal who keeps on repeating his mistakes, and

b. An intelligent animal will generalize his solution so that he can use it to solve subsequent problems of the same sort.[95]

We can expand upon these observations for the purpose of describing intelligent performances in terms of those aspects of that style of proceeding which <u>characteristically</u> such performances exhibit

(different ones in different contexts of course). An intelligent act may be characterized as one that:

1. is flexible (but not random or automatic and rigid) such that:

a. it is sensitive to differences in concrete situations and will correct the acquired routine appropriately (self-corrective).

b. will invent a completely novel routine if circumstances are radically altered.

2. exhibits "multiplex" routines for the achievement of a single and constant goal.

3. can transfer a learned routine to a new situation (generalization of a solution), and possibly as some psychologists (Kohler) claim:

4. is "insightful", which is usually explained as "perceiving a relationship" and is behaviorally exhibited by a sudden change in the (trial-and-error) learning curve, and the absence of further regression to trial-and-error.

It is when we concentrate on intelligence as a style, manner, or fashion of behaving that we can see why so many philosophers have thought that purpose, or intent, or choice, or learning are either analytically or in some other important way connected to the concept of intelligence. For these concepts are indeed connected with intelligence but not quite in the manner originally envisioned.

The intelligent style of proceeding like the instinctive or habitual style of proceeding is purpose--adapted. However, it is distinguishable from these others in that it is not merely purposive (in a functional sense), but purposeful[96] (that is intentional). What

we mean by this, however, is not some psychological state of the agent (an act of intention) but rather the manner or way in which an agent approaches some objective (whether such a goal is consciously entertained or not), as one would describe an agent proceeding through "1.a" to "2" above. But while it is possible to ascribe intelligence to an agent who proceeds in such a fashion, "intention" is not analytically connected to intelligence for the reason that one can also ascribe intelligence to an agent where "1a" to "2" is missing, but "3," let us say, is present. An analysis such as this one serves to unpack such phrases as "thinking what one is doing."

What we are proposing is a kind of "performance criterion" of intelligence but with the difference that it does not concentrate on the dispositional use of the concept so much as the occurrent use of the concept as an adverbially described procedure that marks out a behavior "fashion." This statement requires us to make mention of the "psychological criterion" of intelligence especially in the light of condition "4" above.

A Psychological Criterion of Intelligence?

Condition "4" may very well suggest that among the criteria of intelligence there may exist at least one non-performative but psychological member of a purported disjunctive list. Insight as a "perception of relations" seems to allude to a mental act, an internal performance such as Ryle and Holloway try to avoid. Indeed, while "4" is put in "behavioristic" terms in order to avoid an untestable peep into the introspective consciousness of individuals, it was originally proposed by the gestalt psychologists who insisted on the "ah-ha"

phenomenon or "insight" as one the phenomena associated with intelligent performances.

Undoubtedly most people will say that when they become cognizant of a solution to a problem they have difficulty with, they experience a moment of lucidity that comes upon them "of a sudden." They just do see ("perceive a relationship") how a particular plan of action that suggests itself to them will solve their problem. Unfortunately such moments of clairvoyance are often deceptive.

As Holloway has already pointed out, the introspective report would still have to be matched against the subsequent performance, and it is the performance that determines our judgement concerning the intelligence of the act, not the subjective sense of "insight" that the agent may, or may only believe himself, to have. Of course, this subjective sense of "having got it" could very well function as an indicator of intelligence for the particular individual (it may be a more accurate guage in some than in others), but not as a general indicator of intelligence where other more reliable guages are operative (compare the subjective sense of heat with that determined by a thermometer). Thus the criterion cited by "4" is not a "psychological criterion" but is rather a "performance criterion" that has reference to the probable success of intelligent performances ("sudden change in the learning curve" presumably has reference to successful results).

Purpose and Intelligent Action[97]

According to Nowell-Smith "intention" (unlike learning) is necessarily linked with the concept of intelligence, and comprises part of its meaning.[98]

In explicating his use of the words "intention," "aim," "end," or "purpose," Nowell-Smith provides us with the following account:

> By "intention" I shall mean what is described by a man who gives an honest answer to the question "What are you doing?" by "purpose" what is described when he gives an honest answer to the question "Why are you doing it?" and I shall use "end" and "aim" to include both intentions and purposes...whenever two...answers are so related that we could say that he is doing a for the sake of doing b or in order to achieve b, I shall limit intention to a and purpose to b.[99]

There is a further addendum that while intelligence can be exhibited in cases that lack purpose in the above sense, it can never be exhibited in cases that lack intention in the sense given.[100]

> My thesis is that intelligence can be shown in behavior which lacks purpose in this sense...but that it cannot be shown in behavior which lacks intention.[101]

Thus reflex actions cannot be intentional or purposive even if they succeed in bringing about a desired state of affairs, and so presumably are not intelligent. "Also machines lack intelligence on the grounds that they lack purposes in the primary sense,"[102] and it is very difficult says Nowell-Smith to see on what grounds we could ascribe intelligence to animals in this sense--for we could always say that their behavior "however complicated is routine," and we could always say it was an automatic response to some stimulus. If we do ascribe intelligence to animals we do so with respect to those animals that can be trained, in other words, we rely on a "learning criterion" rather than an "intentional criterion."

In order to avoid an infinite regress Nowell-Smith limits himself to the claim that we do not have to have either intentions or purposes in mind before we act intentionally or purposefully. Hence a

spontaneous act, within the contexts of special situations, even if unsuccessful and badly executed can be intentional and purposive if the question "why did you do it?" can be appropriately answered afterwards.

In the presentation of his position Nowell-Smith seems to be saying two things:

(1) Intentional acts are logically necessary conditions for intelligent acts,[103] and

(2) The criterion of intent is an honest answer to the question: "What are you doing?" so that an intentional act appears to be language-dependent (or at least our knowledge of it is language-dependent), and so intelligent acts (or at least our knowledge of them) are language-dependent.[104]

To take the second thesis first, we notice that Nowell-Smith holds that machines can in no way be intelligent for the reason that:

> ...it makes no sense to say that a machine wants or intends or is trying to do something...successful performance in a machine consists in its doing what its designer or user intends it to do, not in doing what it intends to do.[105]

Now how are we to know that no machines could possibly intend to do anything? We are not given an answer to this question, but the clue is provided by the fact that the criterion of intent given us by Nowell-Smith is the avowal of intent, and since no machines tell us their intentions, and intention is a necessary condition for intelligence, no machine could be intelligent.

That this is indeed Nowell-Smith's position is further attested to by the fact that when it comes to animal intelligence (something most people today, unlike Descartes, are not prone to

doubt), he wonders whether it may truly be attributed to them:

> To predicate intelligence we should need to believe that the animal intended the actual outcome...it is difficult to see what the evidence for this could be...it would always be open to us to say that it was simply a mechanism triggered by a situation.[106]

However, he knows that we do attribute intelligence to animals, and so there must be a reason for this other than the satisfaction of the "intention criterion," thus:

> It is not the complication of the variety of routines of which they are capable which makes these animals intelligent; rather it is the fact that they can be trained...it is this that leads us to say (whether rightly or wrongly) that the dog has got the idea that it is supposed to go through the hoop and intends to do this.[107]

Nowell-Smith ends by "explaining away" the fact that we do call some animals intelligent. According to his view such questionable attributions derive from the association of intelligence with the "ability to learn," and hence with intention, which he thinks is the necessary criterion of intelligence. But why should there be any problem as to animal intelligence? This could only be because Nowell-Smith's criterion of intention is a language-dependent one, and of course animals do not provide us with avowals of intent.

Nowell-Smith makes what must be considered an unwarrantedly sharp distinction between purposes and intentions (=primary sense of purpose), and it is this which leads him to the conclusions just cited concerning animal and machine intelligence. It may be appropriate to say that the words of intention are more often used in describing the purposes of language-users than of non-language-users. However intentions and purposes are not, as we say, for all intents and purposes, distinguishable.

We could think of "intention" as a disposition to act in a certain way under certain conditions--with an avowal of intent merely being a report of one's inclinations to so act, or an expression of determination (but this is not Nowell-Smith's stratagem). We could also think of "intention," as do the dualists or proponents of "the intellectualist legend," in a non-dispositional occurrent sense--as an "act" of intending, with an avowal of intent being a report (the only way for obtaining certainty) of a distinctive mental phenomenon.

The important difference between these two ways of viewing "intention" is that the former makes intent publicly observable with avowals of intent simply one among many different pieces of evidence relevant to the determination of intent.

In many cases such avowals are refuted by noting that individuals making certain avowals of intent do not exhibit any inclination to so act when the appropriate conditions present themselves--either because they changed their minds, were not aware of the circumstances, or were lying or deceiving themselves when they first made their alleged intentions, or some such similar reasons. It is notorious that we can infer an individual's intents and purposes from his actions despite his avowals, and if this is so with language-users why not with animals and machines, should they behave in a characteristically appropriate way? In other words, avowals of intent in response to a verbal query may not be the only criterion of intention or purpose.

The dualistic sense of "intention" makes avowals the primary piece of evidence for the existence of intent with all other evidence subordinate. In this sense one could not refute an avowal of intent, for it is the primary (perhaps the only real) source for any

knowledge of a person's intentions. Only I could be directly apprised of my "mental states" on this view, and no secondary outside evidence can compare with the certainty of my personal experience. It must follow that I am the best judge of my intelligence. However, this view is saddled with all of the problems of the "intellectualist, dualist tradition," so we shall restrict ourselves to the former view.

Is intent a logically necessary condition for intelligent acts? Well, we saw how it was necessary in developing the criteria of intelligence that our test cases be placed within a problem-solving or goal-directed context. Also, in developing the contrast criteria of intelligence what often caused confusion is the fact that some of the unintelligent actions of individuals occurred within goal-directed contexts (instinctive behavior, for example). Hence there is no question but that the context for intelligent behavior is one which brings in the concept of intention, aim, end, or purpose.

It would be quibbling to say that intent is not a logically necessary condition or a criterion for intelligent action, but rather the context for intelligent action; and that intelligent action takes place within a means-ends continuum but that the continuum itself need not be referred to as an explicit condition of intelligence. However, there is a precedence for this and it is the position we here wish to take.

In asserting the conditions under which certain physical laws can be expected to be operative one need not cite the obviously necessary condition that there be a physical universe, and to insist that this be included as a necessary condition would be superfluous. In the same way, the fact that intelligent actions invariably take place within a means-ends continuum does not require us to cite this

as one of the criteria of intelligence for what we are interested in arriving at is a description of how the means are adjusted to the ends by a particular agent and which of the ways of adjustment or styles of proceeding count as intelligent ones. The means-ends continuum acts as a frame as it were, a necessary one to be sure, but nonetheless one that is superfluous to mention given the purpose of describing an action rather than the context in which that action takes place.

Style-Setting Dispositions, Exemplaries and Occasions

What is still needed for us to tie loose ends together is a further clarification of the notion of a "style-setting" disposition, and presentation of the test conditions for discriminating exemplaries and occasions.

Style-Setting Dispositions

R. S. Peters, in a discussion of character and character traits provides us with a general framework for discussing the outward criteria of personality characteristics such as that of intelligence. What is important for us in this analysis is its confirmation of our thesis that "intelligence" as a "trait" has a primarily adverbial significance that indicates a manner or style of behaving, that it is a capacity-word ("nature") and that is does not have an implication-relation with "purpose" or "intent." Moreover, it is supportive of our attempt to work out the outward criteria indicative of the distinctive (polymorphous and determinate) range of "traits" that form the style of proceeding that "intelligence" names.

Peters introduces his discussion by saying that:

> The word "character," like the word "trait," which is often associated with it, is connected with making a distinguishing mark...In their figurative sense, when applied to human beings, they are both used to bring out what is distinctive about people...Their significance is primarily adverbial. They usually indicate a manner or style of behaving without any definite implication of directedness or aversion--unlike the terms "motive," "attitude," and "sentiment."[109]

Whether we speak of "a man's character," of his having "a type of character," or "having character," (which are considerably different ways of speaking) or more generally about "traits" we are speaking not about intrinsic but perceptually extrinsic characteristics. Thus, when we speak of types of character for example we are indicating:

> some distinctive pattern of traits...or some distinctive style in which the traits are exhibited....characters, in this sense, are depicted or delineated either with some dominant trait emphasized as with a typical exaggeration or distortion of a range of traits.[110]

According to this view "intelligence" would not be a character trait (in any of the three ways Peters outlines), for "character" is contrasted with "nature"--a person can decide what his character will be but not his nature:

> A man just is stupid or lacking vitality; he cannot decide to be either of these. But he can decide to be more or less honest or selfish. His inclinations and desires, which are a part of his "nature," may suggest goals; but such inclinations and desires only enter into what we call a man's "character."[111]

Hence, "intelligence" (like "stupidity") cannot be the outcome of a decision and would thus count as a "natural trait." Its significance is primarily adverbial, and indicative of a pattern or range of traits, the perceptually extrinsic characteristics of which delineate a style or manner of behaving.

In the description of any "style" (whether a process--fashion or otherwise) we may have either or both an ongoing and contrasting account wherein the manner of proceeding may be described in such a way that in the first instance many of the features depicted will overlap with those of other styles of proceeding (intelligence with instinct for example) in which case a description of contrasts will be required in order to distinguish the style in question (intelligence) from such others (instinct).

So, for example, if we describe a surrealistic painting by saying that "it is a faithful representation of specific objects with a clarity that filters down to the minutest detail" we will not have marked it off from other painting styles such as the realistic, even if what we say is true. A contrasting description would be in order if we wish to know why it is surrealistic and not realistic. This might be done by adding by way of contrast that "nothing in it makes sense and almost everything in it is suggestive of the strangely disconnected or incoherent images of the dream-world, or the "subconscious." Often such contrasting descriptions will serve as the "criteria" for that style, at least in special contexts.

We found (or rather pointed out) that "intelligence" has not only an adjectival form (which is usually indicative of a disposition) but also a nominal and adverbial form. It is the adjective form "intelligent" on which Ryle bases his dispositional analysis. This use of the concept is typical in such statements as "Galen was intelligent." However, we must make note of the fact that the dispositional use is not the only use to which even the adjective "intelligent" need be put (but when it is, it is a "style-setting"

disposition with an adverbial significance).

We often say that someone or something is "intelligent" without ascribing a disposition to the agent--and we may not be speaking of agents at all: "It was an intelligent thing to do (or say)" or "This is an intelligent saying (maxim, proverb, teaching)." The first of these may be a one-shot affair and so would not describe a general disposition toward intelligent behavior on the part of the agent. The second of these does not characterize an agent at all, but rather a saying which may be uttered by the intelligent and unintelligent alike (if it is not uttered, it may be in print, or it may be a generally accepted homily of the community). Thus while the adjective "intelligent" may be "descriptive," it need not be descriptive of dispositions to act only but when it is so it is descriptive of what we have above described as a "style-setting" disposition. Thus intelligence-words are expressive of a manner of doing things that may be narrated in one of two ways (we here bring together the results of this and previous chapters).

The first of these narrations takes the form of a series of contrasts, which when put together as a list of disjuncts may be called the contrast-criteria of intelligence:

1. If I, then - (CvRvTvHvN)

2. If - (CvRvTvHvN), then I

where C is chance, R is reflex, T is tropism, H is habit, and N is instinct.

Quite possibly R, T, H, and N might be reduced to A: automatism, in which case the contrast-criteria would be reduced to:

3. If I, then - (CvA)

4. If - (CvA), then I

Another descriptive narration of intelligence may take the form not of contrasts but of characteristic activities:

5. If I, then (F_svF_nvMvTvP)

6. If (F_svFnvMvTvP), then I

where F_s is self-corrective flexibility. F_n is inventive flexibility, M is multiplexity of routines, T is transference of acquired rountines, and P is "a sudden change in the learning curve" or probable success.

Both of these narrative descriptions of intelligence operate within a context that this concept has in common with such concepts as habits, tropisms, and instincts, and that is the means-to-ends context. They are all of them purpose-adapted styles of proceeding with the difference that Fs and Fn above make intelligence self-adaptive or "purposeful" rather than just "purposive."

Both of these narrative descriptions (all or some of which) if satisified by some occasion would make it not only an occasion but an exemplary of intelligence. It may be reasonable at this point to make more precise the distinction between exemplaries and occasions.

Exemplaries and Occasions

The verb in "Aristotle reasons logically" is not an exemplary of the tendency to be logical as the verb in "He baked a cake" is an exemplary of the tendency to bake. "Reasons" in this case is an occasion in which the tendency to be logical is exemplified by the manner of reasoning that Aristotle exhibits. But the verb by itself does not do the job of exemplification (if at all), it is the

adverb "logically" that clues us in to the disposition--type or action--contents being referred to. The exemplaries of a concept are either analytically or criteriologically connected with the concept, while occasions need not be and usually are only contingently connected.

Coupling an exemplary with the adverbial form of the concept leads to redundancy in a way in which the coupling of occasions with the adverbial form of the concept does not. (Or to put it another way, coupling the adverb with the contradictory of an exemplary will yield a contradition or something close to it. Thus, while there is no redundancy in "Aristotle reasons logically" there is redundancy in "Aristotle draws valid inferences logically" and contradiction in "Aristotle draws invalid inferences logically." By failing to distinguish between exemplaries and occasions Ryle erroneously assumed that the action-contents of a disposition (that is, its exemplaries) can only be expressed by a verb-form of the concept otherwise the concept must be indeterminate: if there are no unique action-contents (as expressed by a verb) that serve as necessary and sufficient conditions (criteria) for the application of that concept, Ryle reasoned, then it has no "essential" characteristics. This it appears to Ryle is the case with "intelligent" for there is no unique verbal exemplary of intelligence such as "intelligenting." However, contrary to this supposition, our study has shown that intelligence words (when they express dispositions) are descriptive of the tendency to proceed in a special way, and are not descriptive of any of an innumerable variety of proceedings, irrespective of the number of occasions in which that way of

proceeding may be exemplified. Intelligence words find their exemplaries (action-contents) not in those occasions which are described by the verbs of a sentence, but in the episode-qualifying narratives that the adverb of a sentence collects. To put this another way, the disposition to intelligence as expressed by the adjective "intelligent" finds its exemplaries (action-contents) in those process-fashions or episode-manners that "intelligently" (the adverb) names. There does not exist a unique verb of "intelligence," but this does not mean that intelligence is determinable (polymorphous and determinable), for it may well be polymorphous and determinate.

[65]J. Holloway, Language and Intelligence, London, Macmillian & Co. Ltd. (1961): Chs. IV-VI.

[66]Ibid., p. 72.

[67]Compare Ryle's general analysis of dispositional concepts as explanations. Especially his discussion of laws and law-like statements, and the distinction between explaining by virtue of causes, or by virtue of reasons.

[68]Op. cit., p. 84. Once again we move in the direction of assimilating, "intelligence" and know-how."

[69]Ibid., p. 81

[70]Ibid., p. 83.

[71]J. B. Watson, Behaviourism, W. W. Norton & Company, N.Y. (1925).

[72]Op. Cit., p. 64.

[73]Note how close Holloway is to saying that in contrasting say, the intelligent behavior of the dog with the chance behavior of the chicken we show that "intelligence" is descriptive of a manner or style of proceeding in contrast to the other styles of proceeding.

[74]Ibid., pp. 88-89.

[75]It is doubtful whether these distinctions are genuine. They may represent a confused realization that habits (like "abilities") may be used intelligently or unintelligently (note the reference to stupid routine). The contrast between habit and intelligence is meant to bring out the automatic nature of habitual performances as over the flexibility of intelligent ones.

[76]Note again the implication that "intelligence" is a concept obtained by contrast.

[77]Ibid., p. 97.

[78]"According to the account under examination, the intelligence of an action A is to be confirmed by showing that in certain conditions other actions, say B, C, and D..., will occur. If the intelligence of these is challenged, it must be established according to the same technique by proving that others again will occur in appropriate conditioins, and so on indefinitely. But the intelligence of act B is established by establishing the occurrence of other actions, including C and D, and also including A. The evidence for the intelligence of further acts referred to in due course (say E, F, G) is in part the occurrence of B, C, D and A itself. If the challenge is made again...one of two things happens: either as the field widens, the latter actions are failures... the evidence is negative; or else if they are successes consistently... it becomes more difficult... to

look for evidence... that the first stratum of evidence was misleading; and that by hypothesis was favorable." Op. cit., pp. 102-103.

[79]Ibid., pp. 104-105.

[80] The existence of capacities for success in the indefinitely wide field of different but related problems is evidence to satisfy him, because his chief concern was to exclude other hypotheses: that the given behavior was a lucky shot in the dark, or an example of a blind routine." Ibid., p. 103.

[81]"Socrates: I seem to have been lucky indeed... if I have been looking for one virtue and found a whole swarm of virtues in your store... If I asked you what a bee really is, and you answered that there are many different kinds of bees, what would you answer me if I asked you then: 'Do you say there are many different kinds of bees, differing from each other in being bees more or less? Or do they differ in some other respect...?'" Plato, Meno (71E)

[82]Op. cit., p. 97.

[83]I owe this example to Professor Arthur Collins of the City College of New York who presented it in a class discussion.

[84]M. H. Marx and W. A. Hillix, Systems and Theories in Psychology, McGraw-Hill (1963): p. 131.

[85]The salivary response of a dog to the presence of food might have been a better example of a reflex action. Our example is on the boder between a reflexive response and an instinctive one. However, since the distinction between a reflex and an instinct is commonly taken to be the greater complexity of the latter as against the simplicity of the former (but still of the same general type), and since the line between simplicity and complexity is anything but precise-- if there is an error in choice of an example it is not serious.

[86]D. E. Wooldridge, The Machinery of the Brain, McGraw-Hill (1963), p. 81.

[87]Ibid., pp. 82-83

[88]Ibid., pp. 82-83.

[89]A. MacIntyre and P. H. Nowell-Smith, "Purpose and Intelligent Action," Aristotelian Society Supplementary Volume XXIV (1960): pp. 79-112.

[90]Ibid., p. 97.

[91]"The connection between intelligence and learning is by contrast, not logically necessary; Pallas Athene might spring fully-armed from the head of Zeus; but since in fact she does not, since the intelligence displayed in performance by the paradigm case of an intelligent being (homo sapiens) is in fact always learned, the idea of ability to learn is in fact deeply imbedded in the concept of intelligence."

[92]Psychologists are more unanimous in bringing the concepts of learning and intelligence together, and may very well be heading in the direction of fixing some characteristics of learning or the learning situation as analytically connected to intelligence.

[93]Interestingly, this is also the way we test for differences in intelligence.

[94]R. B. Cattel, Abilities, Their Structure, Growth and Action (Houghton Mifflin, N.Y.) 1971: p. 221.

[95]G. Viaud, Intelligence: Its Evolution and Forms (1960): p. 17.

[96]Cattel, Op. cit., p. 213.

[97]For reasons that soon will be forthcoming we don't make much of a distinction between "purpose" and "intention", simply taking the latter to be equivalent to the former in meaning with the only difference being that intent is an avowable purpose.

[98]A. MacIntyre and Nowell-Smith, Op. cit., p. 105.

[99]Ibid., p. 98

[100]Ibid., pp. 98-103

[101]Ibid., p. 98.

[102]"...it makes no sense to say that a machine wants or intends or is trying to do something." Ibid., p. 101.

[103]...we can speak of intelligence and stupidity only where we can speak of exercising judgement, of good or bad choices, right or wrong solutions, and all of these entail the concept of intentional action. The connexion between intelligence and learning, is by contrast, not logically necessary." Ibid., p. 105.

[104]See footnote above.

[105]Ibid., p. 101.

[106]Ibid., p. 102.

[107]Ibid.

[108]Ibid.

[109]R. S. Peters, "Moral Education and the Psychology of Character," in Philosophy and Education; Modern Readings, Israel Scheffler, ed., Allyn & Bacon, Inc. (1966): p. 265.

[110]Ibid., p. 268.

[111]Ibid., p. 265.

CHAPTER IV

THE MINDS OF MACHINES

The contemporary debate (stimulated by the cybernetic revolution) over minds and machines promises a new and interesting approach to the traditional mind-body problem. But the debate has itself become somewhat bogged down in an attempt to determine what "behavioral" characteristics, if any, serve to distinguish a mind from a machine.

The mechanical concept of mind has been defended by appealing to the potential behavior of the digital computer.

Most of the obvious differences bewteen man and machine are brushed aside by those wishing to blur the distinction on the grounds that there is no logical impossibility of constructing a machine that can exhibit all the outward manifestations of human behavior--such as feeling, emotion, sensation, and reproduction.

Arguments have consequently centered around the more complex and important issue of how well a machine can "simulate" human intelligence. This suggests an underlying belief that exhibiting truly intelligent behavior may be crucial to the issue. If intelligence can be exhibited by the machine, the line of demarcation between the minds of men and the "minds" of machines may become no more than a matter of degree (even one that might qualitatively as well as quantitatively

favor the machine). Thus the issue concerning machine intelligence is generally set within the larger context of determining the truth or falsity of materialism. Our purpose however, is neither to defend nor reject materialism but to see where the foregoing analysis of intelligence brings us in judging whether a machine may be said to be intelligent.

A. M. Turing, in a now classical paper ("Computing Machinery and Intelligence"), makes a defense by challenging us to distinguish between a machine and a human player in what he calls "the imitation game."[112]

He hoped to bypass what he considered to be the abstruse problem of defining the concept of "thought," while at the same time presenting the argument that if we cannot distinguish between the overt "communicative" responses of a machine and a human being, then we cannot withhold from the machine the ascription of mental ability. Concession with respect to this argument would open the way for a "mechanical" description of human mentality.

This challenge leaves the dualist with the problem of providing us with mental property concepts that no machine could, on pain of logical contradiction, possess. Such mental concepts have as a matter of course been offered as candidates for debate (consciousness, feeling, creative thought). Unfortunately, the debate generally regresses to the same old impasse concerning the status of these mental concepts: are they to be entirely explicated on behaviorist grounds or do they refer as well to some non-material content?

A basic difficulty in these debates revolves around the tendency of both sides to satisfy themselves with the use of anecdotes

and examples rather than attempting a full-fledged analysis of the concepts involved. To show by anecdote or example that a machine could do such and such is to invite an opponent to show by anecdote or example that it might not be able to do this or that, and so on ad infinitum.

K. Gunderson refers us to this problem when he describes a salesman (Turing?) who in his sales-pitch tells a woman that his vacuum cleaner is an "all-purpose" vacuum cleaner and provides her with the sole example that it picks up some dust particles.[113] She quite properly may not be convinced that it is "all-purpose," while he may quite properly say that he has provided her with an example (what more could she want?) Of course, as Gunderson points out: the problem may not be with the concept of "example" so much as with the concept of "all-purpose."

In the same way, our problem with the debate as a whole is not that examples of intelligence or consciousness or feeling are not adduced but that the antagonists fail to explore these concepts in their entirety.

Another difficulty is the tendency to try to achieve too much by any one argument (or example)--to demonstrate that a machine exhibits some semblance of intelligent behavior, let us say, is not necessarily a demonstration that it has all that goes into having a mind.

A more cautious and potentially more fruitful approach may be to select some one of these mental concepts (as we have done with the concept of intelligence), analyze it separately, and provide an investigation of its uses that would yield the criteria for deciding the legitimacy or illegitimacy of its application to any given

referent. By a process of attrition, as such concepts are investigated separately, we may at some time in the future come to a decision whether or not machines have minds.

In view of such an approach there appears to emerge a strategic error on the part of the materialist when he casts the problem in the mold of an "imitation game."

A natural response is that, of course imitation is distinguishable from the real thing and, at any rate, in the case of the machine, credit redounds to the inventor or programmer and not to the machine itself. Just as the simulation of anger by an actor is not real anger, so simulated intelligence is not really intelligence.

It is important then to determine (as we already have) what it is that we mean when we ascribe intelligence to anything, man, animal, or machine. As a consequence we would be in a position to say what would be required of a machine for us to ascribe intelligence to it.

We will approach the problem of the minds of machines not by deciding in conclusion whether or not machines can be said to have minds but rather whether or not machines can under appropriately imaginable conditions be said to be intelligent. Such a result while it would not allow us to assert that machines have minds, would go a long way toward weakening the resistance to such an assertion.

Turing's Analysis

Turing's substitution of "the imitation game" for "thought"[114] (hence also for "intelligence") is directed at shifting our focus from "psychological (dualistic) criteria" for thought and intelligence to a behavioral analysis of such mental concepts. However, as so often occurs in the behavioral analyses of concepts, an

inordinate emphasis is placed on the final outcome of an act.

Our problem with Turing's machine is further compounded by an uneasiness that perhaps the manner of the posing of the problem has been such as to mislocate the subject to whom thought or intelligence is to be ascribed. For if we broadly envision the original Turing's Machine,[115] it was "invented" by Turing to deceive any interrogator in the Imitation Game. If such a machine was in fact produced, we would marvel at the ingenuity of its constructor but reserve judgement as to the intelligence of the machine until we knew more about how the end-result was accomplished. And once again we would be right to do so for we would be acting upon the knowledge that the end-result can be accomplished by an "agent" by any of a wide variety of means, and we know this prior to the advent of the cybernetic revolution--note the distinction between instinct and intelligence for example: instincts also mimic intelligent performances (but we say they are automatic or mechanical).

Before we could say that the machine thinks or is intelligent we would have to be assured that it is not "acting" automatically (mechanically) but that it satisfies the various criteria for intelligent action (perhaps only then would we be prepared to call it an agent, not an "agent").

Until such a time we would be prone to think of the agent as the constructor or programmer who makes a use of this special hardware and software for the obtainment of Turing's special goal. The machine (even the word used to name it suggests this) is not autonomous.

While Turing reserves section six of his paper for a critique of various objections, his response to such objections are in

fact scattered throughout. They are interspersed and embodied in the description of his machine--first in Turing's original machine (the imitation-game playing machine), and later in a discussion of a machine that learns. We need only concentrate on those objections that have a bearing on machine intelligence. These come down to Turing's "Arguments from Various Disabilities," especially resourcefulness, learning from experience, using words properly, and doing something really new (a variant of Lady Lovelace's objection). These arguments, says Turing, take the general form: "I grant you that you can make a machine do all the things you have mentioned but you will never be able to make one do X."[116] (It will be recalled that it is this general argument that forms part of the basis of Gunderson's critique.)

Turing seems to treat these objections frivolously as though he deemed them to be innocuous. He says of them as a whole that they are the result of faulty induction: Most of the machines with which we have come in contact have had rather limited functions--they are crude in operation and useless outside the scope of their designed purpose. We therefore expect that all machines are to be characterized in this way.

These objections ought to be taken more seriously however, since they appear to pick out some of the characteristic features of intelligence albeit as a haphazard amalgam that fails to distinguish criteria from indicators.

Turing does take some of these objections more seriously than would seem evident in the section being discussed, for he incorporates a serious response to them in his design for a machine. Let us look at these objections separately in conjunction with

Turing's direct and indirect answers to them.

a. Learning from experience.

Learning is that indicator of intelligence which in psychological theory is a primary candidate for analytic status. Turing senses this in that he devotes all of the last section of his paper toward developing the concept of a learning machine. He recognizes the fact that what the capacity to learn demonstrates is a flexibility in the adjustment of ends and means that is lacking in an automaton:

> Intelligent behavior presumably consists in a departure from the completely disciplined behavior involved in computation, but a rather slight one, which does not give rise to random behavior, or to pointless repetitive loops.[117]

The way to provide this characteristic in a digital computer, according to Turing, is to increase its storage capacity to about 10^7 (since the estimated store of the brain varies from 10^{10} to 10^{15} binary digits, and Turing inclines toward a lower value of about 10^9 as necessary for playing the imitation game), and to devise a program adequate to playing the game.

The program should simulate not the adult mind, but the child's mind. Such a machine would then be subjected to a course of "education" that would produce an "adult" machine. The process of education can make use of a "reward" and "punishment" mechanism that would have the effect of increasing or suppressing the probability of machine outputs of specifiable type. The machine may also have a random element built into it for the purpose of searching for solutions to the problems (especially those with several satisfactory solutions). These last two characteristics of Turing's Machine combine to provide what Turing thinks is an important feature for us to make

note of, and that is:

> ...that its teacher will often be very largely ignorant of quite what is going on inside, although he may still be able to some extent predict his pupil's behavior.[118]

The motive for this seems twofold. First, it contrasts with the usual use we make of computers, wherein we try to get a clear idea of the state of the machine at each of its moments of computation--which leads to the objection that "the machine can only do what we know how to order it to do." Secondly, it breaks a user-used dichotomy that holds a strong sway over our imagination (borne of our usual experience with machines) and bars us psychologically from accepting the possibility of machine autonomy: "a machine can be used but it cannot make a use of anything."[119]

The learning machine constitutes Turing's answer to the disability arguments of flexibility and diversity of behavior.

He has fixed on a reasonable strategy, for learning is so often associated with thought and intelligence in the literature, that for some people it takes on the status of an analytic criterion. For such people anything that could learn could also be judged to think and to be intelligent.

In the light of our previous analysis of the connection between intelligence and learning there may be ground for doubting the adequacy of Turing's clever maneuver, at least with respect to some of the specific learning mechanisms (the random element, or trial-and-error learning for example).

b. Resourcefulness and doing something really new.

The lack of resourcefulness in a machine is much like the lack of diversity of behavior for Turing in that both of these come down to saying that a machine cannot have much storage capacity. As

the storage capacity of a digital computer is increased due to technological advance this argument begins to have a diminished force in his view.[120]

The objection that the machine can "never do anything really new" (a variant of Lady Lovelace's objection) is treated rather superficially in the section devoted to this: Turing responds with such saws as "there is nothing new under the sun" and that machines take him by surprise with great frequency. He also comments that the possibility exists contrary to Lady Lovelace's preconceptions that the machine does its work as a consequence of training or by following well known general principles.[121] It is this last remark that constitutes Turing's serious consideration of this objection.

The objection that a machine can do nothing new is not, after all, a literal requirement that what it does should never have been done before, or that is should take us by surprise, but rather that it should exhibit ingenuity and adaptational maneuvers rather than the repetitive and completely predictive maneuvers of the automaton. Thus Turing's answer to this objection is really to be found in the idea he develops of a learning machine. For it is a machine that can learn by reinforcement and non-reinforcement of maneuvers, that can modify its program in conformity with such "experience," that has a random element, and whose procedures cannot be fully or properly described by its constructors or "teachers," that contains the potential for novel action--which indeed appears to be a component of intelligent action.

c. Critical Notes

K. Gunderson in his criticism of Turing's paper, makes what appears to be a crucial point for the whole discussion of machine

intelligence, although the topic of his concern is not intelligence but (like Turing) the general concept of thought:

> Now perhaps comparable net results achieved by machines and human beings is all that is needed to establish an analogy between them, but it is far from what is needed to establish that one sort of subject (machines) can do the same thing that another sort of subject (human beings or other animals) can do. Part of what things do is how they do it. To ask whether a machine can think is in part to ask whether machines can do things in certain ways. [Italics added.][122]

Gunderson seeks to show that there exists a third problem beyond "the performative problem" and "the personality problem" of M. Scriven in his "The Compleat Robot: A Prolegomena to Androidology."[123]

Scriven sees two problems being run together in the question concerning the possibility of a genuinely original thought (which is not exactly the problem Gunderson is concerned with):

> The performatory problem here is whether a computer can produce results which, when translated, provide what would count as an original solution or proof if it came from a man. The personality problem is whether we are entitled to call such a result a solution or proof, despite the fact that it did not come from a man.[124]

The third problem, according to Gunderson (and this time concerning thought in general, not just original thought), is that of "discerning when one subject (a machine) has done the same thing as another subject the human being." To "do the same thing" in Gunderson's sense is not to be identified with "achieving similar end results."

> ...it might be the case that all the achievements were simultaneously attained by a machine, as Scriven suggests, and that we had decided on various grounds that they should count as original proofs and solutions and thus surmounted the personality problem, yet felt unwilling to grant that the machines were capable of "genuinely original thought."[125]

Part of the reason for this unwillingness Gunderson claims is because we focus not on net end results for making the judgement that someone is capable of thinking but rather how those end results were achieved. But another reason why one might withhold the judgement that a machine is capable of thinking is:

> ...because thinking cannot be identified with what can be shown by any one example or type of example...[126] Thinking, whatever positive account is correct, is not something which any one example will explain or decide.[127]

The point here seems to be that thinking because it is a polymorphous concept cannot be demonstrated to exist in a machine by any one example such as success in playing the imitation game. However there seems to be a confusion here that parallels Ryle's confusion about determinate and determinable dispositions. Gunderson apparently believes that thought is a "determinable" dispositional concept, and hence one cannot spell out the criteria to be satisfied by any given agent in order to be considered a thinking agent. One can cite examples, but no finite list of these will suffice for a machine:

> "Thinking" is a term which shares certain features with "all-purpose" as it occurs in the phrase "all-purpose Swish 600." It is not used to designate or refer to one capability, capacity, disposition, talent, habit, or feature of a given subject any more than "all purpose" in the above example is used to mark out one particular operation of a vacuum cleaner. Thinking, whatever positive account one might give of it, is not for example, like swimming or tennis playing. The question as to whether Peterson can swim or play tennis can be settled by a few token examples of Peterson swimming or playing tennis.[128]

Of course, demonstrating that a concept is polymorphous is not tantamount to a demonstration that it is also a determinable rather than a determinate concept as we have already had occasion to show. Thus this basis for rejecting the thoughts of machines is dubious at best since it requires a proof (which has not been

provided) that the concept of thought is not only polymorphous but determinable.

The former criticism that "doing the same thing" is not identical with achieving similar end results rest on a firmer footing. As Gunderson notes, Turing's Machine is basically a net-result mechanism. Turing's arguments turn on the achievement of end-results, the same end-results as would be achieved by a man in playing the Imitation Game.

However (as we have already seen in our analysis of intelligence which concurs with what Gunderson here says about thought), questions concerning thought and intelligence don't turn on end-results so much as they do on the manner or way in which those end-results were achieved. Just as the accomplishment of marvelous and surprising results by a wasp does not lead us to the conclusion that it exercised forethought and intelligence so the achievement of ingenious solutions should not necessarily lead us to the conclusion that the machine thinks or is intelligent: something more is required.

For Gunderson that something more as expressed by the phrase "how they do it" emphasizes such procedures as deliberating, figuring, wondering, reflecting but such procedures are countless. For the machine to be properly compared with man it must be proper to say such things of it, but how many such things is difficult to say precisely because there seems to be no end to them. Gunderson recognizes the logical need to place some limitations on just how many such things must be said about the machine before we will say it thinks, lest we face an impossible requirement, but he is unwilling to say where to place such limits:

> If we are to keep the question "Can machines think?" interesting, we cannot withhold a positive answer simply on the grounds that it (a machine) does not duplicate human activity in every respect. The question "Can a machine think if it can do everything a human being can do?" is not an interesting question, though it is somewhat interesting to ask whether there would not be a logical contradiction in supposing such to be, in fact, a machine.
>
> But as long as we have in mind subjects which obviously are machines, we must be willing to stop short of demanding their activities to fully mirror human ones before we can say they can think, if they can. But how far short?[129]

The requirement that machines do what humans do in order to be considered thinking agents is borne of the realization that thought (as well as intelligence) has a procedural (executive manner or fashion) component upon which its meaning is dependent, more so than on its end-results. However, Gunderson's criticism also rests on the dubious thesis that there is no end to the exemplaries of "thought," and so whether we are to call a machine a thinking agent rests upon a decision as to how many of these exemplaries of thinking it must satisfy. It is true that much of Turing's arguments rest on the achievement of end-results, the same end-results as would be achieved by a man in playing the Imitation Game. For this reason, together with the fact that the ascription of thought or intelligence is independent of net-results, Turing's arguments fail to show that machines could think. Still, Turing is not without sensitivity to the central tenet of this issue, and this is reflected in his lengthy speculations concerning a learning machine.

His design for this machine shows an awareness on his part that an agent (especially a machine) that is to have any semblance of intelligence or thought must exhibit a style of proceeding that is

autonomous, self-corrective, flexible, capable of novel solutions, and adaptive with respect to changing conditions. Unfortunately many of the proposed mechanisms for obtaining such fashions of proceeding have more in common with and seem more to be simulations of the intelligence-contrasts than of intelligence-proceedings.

Turing proposes to increase the machine's storage capacity (to allow for greater combinations of possible responses) to "educate" the machine by providing it with a decision function ("rewards" and "punishments") that would give greater weight to some maneuvers over others, and providing it with a random function that would make for an increase in possible solutions as well as make it difficult to know what the precise computer response will be (for the sake of autonomy and flexibility).

As it turns out, the inclusion of a "decision" ("reward" and "punishment") mechanism for the weighting of different machine operations is more analogous to conditioning (an intelligence-contrast) than it is to intelligence. A machine that operates on this principle alone could not properly be considered intelligent or thoughtful, since it would exhibit a style of proceeding that contrasts with intelligence (as does the chicken's behavior, although the probability of a successful outcome increases with each successive try). Similarly, a random function would render the machine's operations analogous to the trial-and-error procedure of unintelligent animals. Its flexibility would be increased at the cost of making its successful results subject to the judgement that it was "chance success" or "a lucky stroke"--a style of proceeding that once again contrasts with that of intelligence. In the meanwhile, whatever

results the machine achieves as a consequence of a large store of programmed responses would be considered "automatic" and so (even if surprising) compare well with the behavior characteristics of an instinct--another one of the intelligence-contrasts.

It may be properly said that all of these same characteristics (conditioned responses, trial-and-error problem solving, as well as an expanding store of routines) are present in intelligent animals and so are together conducive to the production of intelligent responses. Unfortunately it is not the mere presence of these characteristics that make an act intelligent (for they are present where intelligence is non-existent) but the way in which they are used, and not by an outside agent but by their possessor.

A machine made up of the separable units of a store (acquired with the help of a decision function), an executive unit (coupled with a random function), and a control, would imitate not an intelligent animal (at least not necessarily so) but animals with the different styles of proceeding that each of its components would as separate units cause it to imitate (one time "instinctively" another time "by chance," and another time by "conditioning").[130] A machine so constructed could conceivably operate in an intelligent manner but this would depend upon how the different components of its structure were integrated in the face of some specific obstruction or problem that it would have to overcome, in order to achieve some built-in objective (its "motivation").

a. The "intelligence" of computers

The present-day electronic digital computer obtains its resemblance to human intelligence from the fact that it is capable of

manipulating elements of its environment (information) toward the solution of specific problems. These machines have a device for the acquisition of information (input) which is "read" in from punched cards or discs.They have a memory drum which serves as a storage unit for the data needed for is calculations. The processing or "executive" unit does the actual calculation, and the control unit ("a program") regulates the operations of the machine on such data as it has obtained. In addition there is an output (print-out) in the form of a teletype, card-puncher, typewriter, drums or even an optical scanner.

A machine constructed in this fashion can be programmed to "reason" to the degree that this occurs in most forms of deduction and in the assessment of probabilities. For at least some of these forms of inference can be mechanized, and in many tasks of mechanical computation the machine will outperform the human in speed and accuracy. If the machine has a physical control as an output device (as is the case in an automatic pilot or a homing rocket), then the machine's operation will resemble the muscular actions of the animal, executing a deliberative move.

b. Differences between the machine and man.

1. The input and sensory experience.

The input of a machine is a poor analogue to animal sensoria. A machine does not see, hear, smell, taste, or feel anything. However, most computers are not designed to imitate human perception (there is not much commercial interest in such a design) and so part of the reason for deficiency in this area is only contingent. There is in principle no impossibility of providing such machines with "vision" and "hearing" by constructing them with selenium cells and by use of a telephone decoding device.[131] They can,

in addition, be provided with "tactile sensations" and be made sensitive to temperature changes by the installation of pressure-sensitive devices and a thermostatic apparatus. Thus machines can be provided with direct analogues of every sensory organ so that this difference between man and machine can hardly be considered insuperable.

2. Inductive vs. deductive reasoning

We already mentioned the enormous capacity of the computer when it comes to deductive reasoning. A machine will often outperform the best philosophers and mathematicians when it comes to calculations based on deductive inference. However it is in the area of inductive inference, and associated capabilities, that the machine fares rather poorly.

Rudimentary "learning" machines exist, but the question as to how far along they are toward genuine inductive generalization and relation-perception is still open:

> ...as far back as 1959 Samuel showed that a computer can be programmed so that it will learn to play a better game of checkers (draughts) than the person who wrote the programme. Furthermore, it can learn to do this in a remarkably short period of time (8 to 10 hours of machine-playing time) when given only the rules of the game, a sense of direction, and a redundant and incomplete list of parameters which are thought to have something to do with the game, but whose correct signs and relative weights are unknown and unspecified.[133]

The game-playing success of this computer results from a program that makes the machine operate on a principle of general probabilities. Out of its memory-store it chooses that play which in past games were usually "rewarded" by a win. This can be considered trial-and-error learning and is demonstrative of a flexibility that reaches beyond the simple and rigid routine of exhausting all the logical possibilities (this is all that machines were ever capable

of). In fact the number of possible combinations in checkers (there are more in chess) is estimated to be 10^{120} making it well nigh impossible for the computer to work its way through all the possibilities in that way.[134]

Interesting though this capacity in the machine may be, and despite the fact that a machine with such a function will outperform a human player, it is reminiscent of trial-and-error or rote learning in humans, and so is not of the right sort for the ascription of intelligence. It is still in keeping with a deductive operation that its results are achieved albeit with greater plasticity. Although it is undeniably akin to learning, it may still be considered "blind." Like trial-and-error learning in the animal it is explainable in "mechanical" terms (in the animal in reflexive terms).

As we have already noted in our discussion of intelligence, learning should not uncritically be taken as indicative of the presence of intelligence. There are at least two types of learning and the one that is wanted is "insightful" learning, that is learning that expropriates relationships between means and ends (relation-eduction) from its "experience." This capacity is most sharply brought out in the distinction between <u>inductive</u> and <u>deductive</u> reasoning, especially in inductive generalization.

Machines have done very poorly in the recognition of <u>patterns</u> (no matter what "sensory" apparatus is utilized) although programs exist that would permit computers to remember, to use methods that solved other problems, to adjust internal parameters for the obtainment of the best results, and to "associate" those symbols that have been correlated previously.[135]

While a child, a chimpanzee, and even a cat can recognize a triangle (with variations in size, distance, and angle of vision) a computer is capable of responding to a triangle only when everything in its presentation is maintained constant. The machine's undoing is its extreme precision; it is too literal and, like the insect, rigid and meticulous in the execution of its instinct-like response. It does not accept approximations but only the precise value of each presentation.

A human being is able to perceive common relations in a wide variety of complex and different circumstances. On a "simpler" level, he is able to recognize dintinct object-types, classes of objects, and to recognize that that particular object belongs to such-and-such a class, despite differences of size, brightness, perspective, and so on. The difficulty in making machines do this is partially due to our ignorance of how humans do it.[136] Nonetheless machine programs have been devised that would allow a machine to simulate inductive generalization in much the same manner as it appears to occur in humans.[137] Thus the General Problem-Solver of Newell, Shaw and Simon provides us with a program for a machine that will solve a variety of logical problems, especially the discovery of proofs in trigonometric problems. What is of interest in the approach is that the solutions are obtained in a manner in which humans reportedly solve such problems.

The machine begins a search from both end-points for logical connections between A and B. It examines the differences between A and B and embarks on a series of transformations that would lessen any such differences. With each transformation it embarks on a subroutine of transformations to lessen the differences between A^1 and

B^1, and so on, until a solution (or proof) is obtained.

There are other programs that allow a machine to handle some of the problems that occur on intelligence tests, such as a Letter Series Completion Problem as occurs in the Thurstone intelligence examinations. Such a machine has solved thirteen out of fifteen problems correctly. One of the two it failed to solve (No. 7) was also the one human subjects found most difficult.

A machine program exists that solves analogy problems that require a comparison of geometrical figures in a manner similar to that of the General Problem Solver. The most interesting of these programs is the one that has the machine follow the edges of a shape and report: "This has three corners," or "This has four straight edges."[138] Programs have been devised on this same basis whereby machines would be enabled to solve analogies and classification problems as a consequence of the capacity to discriminate patterns. This brings "computer" behavior closer to that process-fashion that exhibits a capacity for identifying a central tendency in individually different presentations (what is common to all things of one kind--i.e., relations eduction).

Another such program that would enable the "computer" to sort out individuals into distinct classes is the Taxonome program of Coulter and Cattell:

> Just as a child may be a little puzzled at first by the behavior of a Siamese cat, wondering whether it is a cat or a dog but eventually settles for a cat, so the computer will recognize that the "distance" of a case from several type models gives it varying resemblances, which, it can appreciate. On this basis which implicity involves determining the relationship in quantitative terms, between two patterns, the computer can begin to "perceive relationships," giving it the beginning of insight.[139]

So it seems that the machine may be good not only at what psychologists call the "primary abilities" (numerical ability, deductive reasoning, spatial ability, memory, etc.), but with the advent of pattern recognition, we have a machine that begins to evince the higher order abilities, most importantly the eduction of relations: this demonstrates a capacity to perceive relationships, and is on the way toward satisfying the intelligence-criterion of "insightful" behavior.

However, the machines that do this don't do it well, and none are capable of handling the problem of perceiving relationships among relationships (that twice, thrice...are ratios, or that mother-son, father-grand-father...are family relationships), but this doesn't seem to pose insurmountable logical difficulties.

Another disability poses greater problems for the acceptance of machine intelligence, and it is more of a psychological roadblock than it is a logical one--that of machine autonomy.

c. The autonomous machine

In his design for a learning machine, Turing thought that an important feature of his machine would be that its teacher be largely ignorant of how the machine achieves its objective. This is important since we generally think of the machine as our tool that we use to obtain our ends. "Machines do not have their own motives and goals," is what we usually say, "and hence do not make adjustments of means to ends based on their own purposes, but act automatically through the auspices of those mechanisms that we have built into them for our own purposes."

This "problem" of machine autonomy links up with the "problem" of whether or not a machine can effect important changes in

its own program. For a machine that can do this would conceivably be a "run-away machine": we would not necessarily keep track of every change if effects, thus providing itself with non-built-in objectives and motives and hence it would be independent of our purposes and machine design. Thus the psychological roadblock toward admitting machine intelligence is dependent on the issue whether or not it is logically impossible for a machine, on the basis of its own "experience" and "reasoning" procedures to work a change in its own basic program (and even possibly its hardware).

Now we know that a machine can effectively solve a surprising variety of problems, including some which were heretofore considered the special province of intelligent insightful beings. What would be required is that a machine be capable of focusing its problem-solving apparatus on its own program, "know" something about its own problem-solving process, and recognize any improvements when it comes across them. Thus a machine that is given a model of its own program and structure, could set to use its problem-solving power on its own efficiency, effectiveness, and objectives. And a machine that could do this would break the psychological hold that the notion of machine dependency has on us.

A machine genuinely capable of improving its own structure would set a process of evolution going which we could not very well predict, even if we could do so during the initial stages. But the development of such a machine would require a greater understanding on our part on how the eduction of relations is achieved not through the predigested material fed into it by a human but through some real world input obtained through the auspices of machine sensory modalities. Barring the fact that no machine has convincingly

demonstrated a capactiy for inductive generalization of the complex sort, and that no machine has been built to effect changes in its own program, many of the features that different computers already possess, if built into a single machine, would satisfy many of the criteria for intelligence. Thus:

i. flexibility is satisfied by the Selfridge and Neisser program that can solve analogy and classification problems by pattern discrimination: it is sensitive to differences in concrete situations and will correct the acquired routine appropriately (self-corrective). The same may be said for the Taxonome of Coulter and Catell.

ii. is satisfied by these same machines as well as the General Problem Solver and the checkers and chess-playing machines: they exhibit "multiplex" routines for the achievement of a single and constant goal.

iii. is satisfied once again by the Selfridge and Neisser program and the Taxonome program: they can transfer a learned routine to a new situation (generalization of a solution).

Whether criterion No. iv is satisfied is subject to debate, and we must concede that the computer programs spoken of just barely touch on "insightful" procedures, if they do at all.

Whether we are to call machines intelligent will depend on whether or not we can construct machines that will satisfy all of the criteria of intelligence simultaneously. While we are prepared to say that humans have intelligence if they but satisfy some of the criteria in any given context, our psychological predispositions will not permit this judgement in the case of machines. These psychological roadblocks will evaporate only when all the criteria have been satisfied.

This is not to say that it is not always open for anyone to require less for machine intelligence, even correctly and coherently so. After all, it is not required that animals do all things that humans do, for us to judge them to have intelligence. Nor do we require all humans to match the capacities of other humans in order for us to consider them to have intelligence. We express these differences as differences of degree. On a strict application of this analogy, there is no reason why we could not argue that while machines don't duplicate human activity in every respect neither do animals, but this does not force us to withdraw the ascription of intelligence so long as some of the criteria for the application of the concept are satisfied. This might be viewed as a strong interpretation for the application of the concept. However, our knowledge that machines are manufactured, that they are not living organisms, and we have heretofore never found occasion to apply this concept to anything but that which is alive produces a psychological resistance to the strong interpretation. But this is a psychological fact not a logical or philosophical objection. Nonetheless, a weaker interpretation for the application of the concept of intelligence ought to overcome not only any philosophical objection, but also this emotional or psychological one. Thus, we can concede the (emotional, psychological) need for a maximal requirement when it comes to machine intelligence - a requirement that need not stop short of the demand that the activities of machines fully mirror the intelligence - activities of humans.

This does not leave us with the quandary suggested by Gunderson (see footnote #129) since "intelligence" is determinate (not indeterminate) and there exists a finite set of criteria for its application. Hence there exists a natural limit to the requirement

that "machines do what humans do." There is no problem of knowing when to stop short of the demand that machines fully mirror the activities of humans, or that the line be drawn arbitrarily. For as soon as machines fully satisfy all of the criteria for the application of the concept of intelligence there will be nothing left over for anyone to demand. Thus the position here taken ought to meet both the logical and psychological demands anyone might make with respect to machine intelligence.

[112]A. M. Turing, "Computing Machinery and Intelligence," in Minds and Machines, Anderson, A. R. ed. (New Jersey: Prentice-Hall, 1964), pp. 4-30.

[113]K. Gunderson, "The Imitation Game," Op. cit., pp. 60-71.

[114]The "substitution" is only concerned with the "thoughts" of machines. That is, for the question "Can machines think?" Turing would substitute "Can machines play the imitation game?"

[115]We will use the phrase "Turing's Machine" as the machine spoken of in this particular article in contrast with the "Turing Machine" -- the simple theoretical machine that is an elementary principle in machine theory.

[116]A. M. Turing, op. cit., p. 18.

[117]A. M. Turing, op. cit., p. 29.

[118]Ibid., p. 29. Turing makes similar remarks about the inability of the machine's constructor to describe its operations on p. 7.

[119]Among the list of objections provided is the machine's inability to use words properly.

[120]"I believe that in about fifty years time it will be possible to program computers with a storage capacity of about 109." Ibid., p. 13. Present-day computers have a storage capacity as high as 10 mega bites (8 bits to a bite).

[121]Ibid., p. 21.

[122]K. Gunderson, op. cit., pp. 64-65.

[123]Scriven, Michael, "The Compleat Robot: A Prolegoema to Androidology," in Dimensions of Mind, Sidney Hook, ed., pp. 118-142. New York: New York University Press, 1960.

[124]Ibid.

[125]Ibid., p. 68

[126]Ibid., p. 67

[127]Ibid.

[128]Ibid., p. 68.

[129]Ibid., p. 70

[130]Note that in each instance there is a successful outcome but each satisfactory result is obtained by a different style of proceeding.

[131]There already exist machines that can test answer sheets and "respond to shapes cast by and 'eye' lens on an electric retina. The Bell Telephone Company's 'Audrey' also reacts to sound coded from a microphone, and can thus respond to spoken instructions." Cf. Cattel, Abilities: Their Structure, Function and Growth (Houghton, Mifflin, 1971), p. 237.

[132]Ibid., p. 256.

[133]H. J. Butcher, Human Intelligence, It's Nature and Assessment (London: Methuen & Co., 1968), p. 133.

[134]Ibid.

[135]Ibid., p. 136-37.

[136]Ibid., p. 242.

[137]Ibid., pp. 134-136

[138]Cattel, Op. cit., pp. 242-244

[139]Ibid.

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