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Cartesian philosophy and the study of language.

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CARTESIAN PHILOSOPHY

AND THE STUDY OF LANGUAGE

A Thesis Presented

By

Gert Webelhuth

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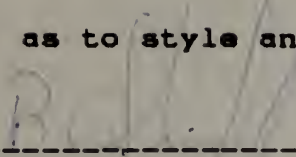
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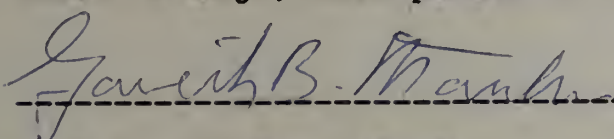
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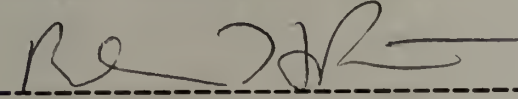
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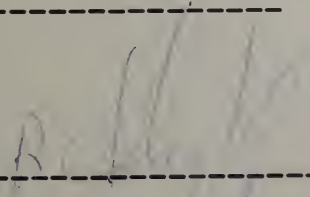
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CHAPTER I

CARTESIAN PHILOSOPHY

Bertrand Russell begins the chapter on Descartes
in his monumental work "A History of Western Philosophy"
with the following sentences:

> Rene Descartes (1596 - 1650) is usually
> considered the founder of modern philosophy,
> and, I think, rightly. He is the first man of
> high philosophic capacity whose outlook is
> profoundly affected by the new physics and
> astronomy. While it is true that he retains much
> of scholasticism, he does not accept foundations
> laid by predecessors, but endeavors to construct
> a complete philosophic edifice de novo.
> (Russell 1945, 557)

In this chapter we will try to give an overview of
the main results of the philosophical life work of
Descartes. These philosophical theses will form the frame
of the discussion of most of what is to come in later
chapters of this thesis. In our presentation we will give
priority to Descartes' exposition of his philosophical
system in "Meditations on First Philosophy" (1641), taking
into account the "Discourse on Method" and "The Principles
of Philosophy" where appropriate.[1]

In the first of the six "Meditations on First Philosophy in which the existence of God and the distinction of the soul from the body are demonstrated" Descartes lists the things that he has come to doubt. In fact it has occurred to him that as a child he has developed many prejudices about the world around him and about himself which later turned out to be false, so that he will now try to rid himself of all the beliefs that he has had which might even be doubtful to the smallest degree. The task of these meditations is to assume everything to be false which is not absolutely indubitable and to reconstruct all knowledge about the external world, about his own mind and about God on the basis of the first indubitable principles he can find. But what is indubitable? Can we, for example, rely on our senses to tell us the truth about the external world? Descartes concludes that we cannot:

> All that up to the present time I have accepted as most true and certain I have learned either from the senses or through the senses; but it is sometimes proved to me that these senses are deceptive, and it is wiser not to trust entirely to any thing by which we have once been deceived. (145)[2]

Furthermore, there are madmen in the world who believe themselves to be kings and who purport to see things that other people do not see. How can we know that

we aren't like these poor people, e.g. that we aren't also mistaken in our belief that what we believe ourselves to see really exists? And worse, even if we assume ourselves to be mentally sound, nevertheless there are times, especially at night during our dreams, when it seems that we perceive things in the external world which aren't really there and when we believe ourselves to be in rooms we have never been in etc. How do we know at any time t that we are awake rather than asleep?

Of course, we can tell that we are awake from the fact that our hands move when we intend to move them and likewise our head turns when we want it to turn. But stop, how do we know that we aren't mistaken in assuming that we have hands and heads? Maybe there exists a God who constantly tries to mislead us into believing things about the world which aren't really true.[3]

We prefer to believe that there does not exist such a vicious God. For us, God is a being with best intentions who only wants our best.

> But possibly God has not desired that I
> should be thus deceived, for He is said to be
> supremely good. If, however, it is contrary to
> His goodness to have made me such that I
> constantly deceive myself, it would also appear
> to be contrary to His goodness to permit me to
> be sometimes deceived, and nevertheless I cannot
> doubt that He does permit this. (147)

Thus, if we want to follow the method for rightly conducting our reason and for seeking truth then we cannot assume that God will not deceive us unless this follows from indubitable premisses. Until then the following holds:

> I shall then suppose, not that God who is supremely good and the fountain of truth, but some evil genius not less powerful than deceitful, has employed his whole energies in deceiving me; I shall consider that the heavens, the earth, colours, figures, sound, and all other external things are nought but the illusions and dreams of which this genius has availed himself in order to lay traps for my credulity; I shall consider myself as having no hands, no eyes, no flesh, no blood, nor any senses ... (148)

It seems then that if we follow the method of the Cartesian doubt, then we "feel constrained to confess that there is nothing in all that I formerly believed to be true, of which I cannot in some measure doubt" (148). Meditation I therefore leaves us with a state of affairs in which nothing is certain about our knowledge. But Descartes does not give up. He is decided to take the challenge of seeking something which is absolutely certain so that he can base other knowledge on this certitude or if he cannot find such a thing to conclude that there is at least one certainty: namely that nothing is certain. Even that result would refute the sceptics who were

claiming that nothing is certain, since we would at least have found one certain proposition.

We still hope to find something which is indubitable. What might it be however? Not God, for he might be an object of my dreams. Not senses, bodies etc., since I had persuaded myself that I might be deceived by something or somebody to take their existence for granted although they do not really exist. Stop! I just thought that I persuaded myself of something:

> of a surety I myself did exist since I persuaded myself of something (or merely because I thought of something). But there is some deceiver or other, very powerful and very cunning, who ever employs his ingenuity in deceiving me. Then without doubt I exist also if he deceives me, and let him deceive me as much as he will, he can never cause me to be nothing so long as I think that I am something. So that after having reflected well and carefully examined all things, we must come to the definite conclusion that this proposition: I am, I exist, is necessarily true each time that I pronounce it, or that I mentally conceive it. (150)

This argument is commonly referred to as the "cogito".[4]

We thus have found the base of our reconstruction of knowledge, we have found at least one indubitably true proposition. On this basis we can build up the body of our knowledge through orderly philosophizing.

Let us therefore take the next step, from

Descartes' point of view: I know now that I exist. But we have not yet determined, what and who I am, I who necessarily exist. To find out what I am, I have to determine my essence, in other words: I have to find the element or the property that I perceive if and only if I perceive myself.[5]

It cannot be my body, since I who exist because I think, can conceive of myself as existing without a body. And it can also not be the property of walking, for first of all I do not have a body and second, even if I had one, then the great deceiver might still give me the impression of walking although I am lying in my bed deep asleep. Isn't there anything that cannot be detached from me, no matter what happens? Well, there is: my thoughts. Those cannot be taken away from me. Even if I am deceived, still I am thinking. Each time that I perceive myself I perceive thinking and each time I perceive thinking, I perceive myself.[6]

Therefore,

> I do not now admit anything which is not
> necessarily true: to speak accurately I am not
> more than a thing which thinks, that is to say a
> mind or a soul, or an understanding, or a
> reason, which are terms whose significance was
> formerly unknown to me. I am, however, a real

> thing and really exist; but what thing? I have
> answered: a thing which thinks. (152)

Cartesian doubt has led us to establish the sentence "I think, I am" as the firm foundation of our body of knowledge. Further research makes clear that my essence is thinking and that I as a thinking being need neither a body nor any other material thing for my existence. Furthermore, since the essence of me, the thinking soul, is thinking, I must always think, whether I am asleep or not.

I think, i.e. I doubt, understand, affirm, deny, will, refuse, imagine and feel. How do I sense, perceive things? This is a difficult question to answer. For, take a piece of wax. It may smell of flowers, it has a certain color, shape and size; it is hard and cold. So it seems to have everything needed for me to know it distinctly. But all of this ceases rapidly, if I put it close to fire. Suddenly it loses its odor, color, its original shape. Furthermore it becomes hot. I have to ask myself the question: Does the same wax remain? I think so; but which property of the wax is it that allows me to judge that after this transformation I am still perceiving the same wax as before? None of the sensible qualities I named so far, for they are all subject to change. "We must then grant that I could not even understand through the

imagination what this piece of wax is, and that it is my mind alone which perceives it" (155). This is true in general:

> There is certainly in me a certain passive faculty of perception, that is, of receiving and recognising the ideas of sensible things, but this would be useless to me (and I could in no way avail myself of it), if there were not either in me or in some other thing another active faculty capable of forming and producing these ideas. (191)

We can know things with our minds, our senses are not of much use in this respect:

> no ideas of things, in the shape in which we envisage them by thought, are presented to us by the senses. So much so that in our ideas there is nothing which was not innate in the mind, or faculty of thinking, except only these circumstances which point to experience... They transmitted something which gave the mind occasion to form these ideas, by means of an innate faculty, at this time rather than another.[7]

Descartes does not dispense with external experience altogether, rather he postulates an interaction between the sense perception of data from the external world and an innate capacity of idea-formation. The mind is a universal instrument of reason analyzing sensory experiences in a predetermined innate manner. Learning is thus remembering of knowlege already in the mind, rather

than the acquisition of new information through sensory experience, very much in a Platonic manner:8

> And not only do I know these things with distinctness when I consider them in general, but likewise (however little I apply my attention to the matter), I discover an infinitude of particulars respecting numbers, figures, movements, and other such things, whose truth is so manifest, and so well accords with my nature, that when I begin to discover them, it seems to me that I learn nothing new, or recollect what I formerly knew - that is to say, that I for the first time perceive things which were already present to my mind, although I had not as yet applied my mind to them. (179)

Gardner also notes the similarity of Descartes' theory of knowledge with Plato's:

> If Descartes could have dispensed with external experience altogether, he would have been pleased to do so; again, like Plato, he attributed human error and inconstancy to the vagaries of experience, and our rationality, understanding and genuine knowledge to the mind reflecting upon its own ideas. (Gardner 1985, 52)

But our powers of reasoning are not infinite. In fact, they are delimited by the structure of our mind and our mind is finite. We are thus only capable of "limited knowledge" (177) and we have to be grateful to our creator that he gave us what we have:

> For I have certainly no cause to complain that
> God has not given me an intelligence which is
> more powerful, or a natural light which is
> stronger than that which I have received from
> Him, since it is proper to the finite
> understanding not to comprehend a multitude of
> things, and it is proper to a created
> understanding to be finite... (177)

However, these severe constraints on our faculty of knowledge still leave a vast terrain of knowable matter, which cannot be imitated by a finite machine. This comes out in the discussion of the "language test" and automata in the next chapter.

So far we have established that we as thinking beings exist, that the essence of our soul is thinking in the broad sense and that the class of thinking-faculties which enable us to analyze sensory experience from the external world as information is innate. Our intellect is finite, although it is a universal instrument of reason and allows flexible responses to external stimuli in indefinitely many situations.

We do not yet know that there exist bodies. To prove this we first have to prove the existence of God. This is proven by assuring ourselves that we have a clear and distinct idea of God in us.[9]

This very idea that I have of God shows him to be perfect,

infinite and therefore incomprehensible for me with my

finite mind. What is the origin of this idea in me? It has

to be the effect of some cause. But

> now it is manifest by the natural light that
> there must at least be as much reality in the
> efficient and total cause as in its effect. For,
> pray, whence can the effect derive its reality,
> if not from its cause? And in what way can this
> cause communicate this reality to it, unless it
> possessed it in itself? And from this it
> follows, not only that something cannot proceed
> from nothing, but likewise that what is more
> perfect - that is to say, which has more reality
> within itself - cannot proceed from the less
> perfect. (162)

So, God has to exist, for otherwise the existence of this

idea of this perfect, infinite being in me, an imperfect

and finite being, would be inexplicable. And it follows

also that God cannot be a deceiver, since my idea of him

tells me that he is perfect; but being a deceiver would

certainly mean imperfection. It can thus be proven by my

light of nature that God is not a deceiver which in turn

will lead us to other insights:

> But after I have recognised that there is a God
> - because at the same time I have also
> recognised that all things depend upon Him, and
> that He is not a deceiver, and from that have
> inferred that what I perceive clearly and
> distinctly cannot fail to be true... (184)

Among the things that I have ideas about are objects which

have certain properties, modes. These are modes like extension and color. These modes must have a bearer, since modes cannot exist without a substance that they are attached to. But this substance cannot be me as a thinking substance, since extension and color are not modes of a thinking substance. They therefore have to be attached to material bodies and in fact I see clearly and distinctly that these material objects exist outside of me. If this were not true, then God would be deceiving me in making me believe that there are material bodies outside me with certain sensible properties. But God is no deceiver: therefore material things outside of me have to exist. This is established now.

One specific body that exists is more closely related to my soul than others, for I have the ideas of pain, thirst and hunger in my soul when this body is ill-disposed, suffers thirst or hunger. Since I do not have these ideas when other bodies are in these states, I have the clear and distinct idea that my soul is united with one and only one body. There are some important differences between my body and my soul. My body, for example, is divisible, it consists of arms and legs etc. Even if an arm or some other extremity were taken away from my body, this wouldn't affect my mind. But my mind is indivisible; all the faculties of the mind are aspects of

the same capacity of thinking. If we hadn't been convinced
of the difference of body and soul anyway, this would have
been enough to mark a clear distinction between these two
substances. Body and mind have entirely different essences
and modes.

With this first formulation of Cartesian dualism
we end our selective overview of Cartesian philosophy and
turn to a more substantial argument for the dualism of
mind and body in Descartes' work: chapter 2 will deal with
the "language test" as an argument that man has a
mind/soul whose performance cannot be explained in
mechanical terms.

1. Consequently most of the quotations from the original works of Descartes will be taken from the Meditations, so that it will be understood that the quotations are from this work, unless specifed differently. All our quotes are taken from the translation in Haldane/Ross (1911).

2. We find a similar quotation in the Principles, Part I.

3. This same feeling seems to be expressed more than 300 years later by the biologist and Noble Prize winner George Beadle when he writes about an experiment designed to prove the correctness of the DNA-structure proposed by Watson/Crick (1953):

> The evidence is fairly convincing that these are single chains of DNA. This experiment strongly suggests that the Watson-Crick hypothesis of DNA-replication is correct, but does not prove it. A perverse nature might have devised another way of giving the observed results. (Beadle 1963)

4. There exist different interpretations of the cogito in the literature. Wilson (1978), for example defends the "naive" interpretation of the cogito, which is attacked in Hintikka (1967) where the "performatory interpretation of the cogito" is proposed (on that cf. also Feldman (1973)). Matthews (19) argues for a "methodological interpretation". We will not defend one or the other of these interpretations here, since our later discussion is quite independent of this topic. An argument very much like the cogito had been given before by St. Augustine.

5. For this method of determining the essence of some object, cf. Malcolm (1965).

6. Descartes takes "thinking" in the broad sense: "A thing which thinks. What is a thing which thinks? It is a thing which doubts, understands, (conceives), affirms, denies, wills, refuses, which also imagines and feels." (153)

7. Quoted in Gardner 1985, 52)

8. This mirrors essentially the theory of knowledge developed by Plato in the Meno-dialogue (81 c ff) and Phaidon (72e - 77b). Cf. the following passage from Meno:

> Seeing then that the soul is immortal, and has been born many times, and has beheld all things in this world and the world beyond, there is nothing it has not learnt; so it is not surprising that it can be reminded of virtue and other things which it knew before. For since the whole of nature is akin, and the soul has learned all things, there is nothing to prevent someone, upon being reminded of one single thing - which men call learning - from rediscovering all the rest, if he is courageous and faints not in the search. For learning and inquiry are then wholly recollection. (Plato 1984, 163f)

In the Notes against a certain program it seems at first sight as if Descartes is denying his claim of innateness, for there he says that he never claimed that the mind had innate ideas besides those which make up its capacity of thinking. But one should bear in mind that Descartes has a very broad concept of thinking: doubting, understanding, affirming, denying, willing, refusing, imagining and sensing are all acts of thinking. And some of these innate ideas are of a special kind, they are dispositions for the analysis of external data presented to the mind, as comes out quite clearly from the following passage from the Notes:

> but when I observed the existence in me of certain thoughts which proceeded, not from extraneous objects nor from the determination of my will, but solely from the faculty of thinking which is within me, then, that I might distinguish the ideas or notions (which are the forms of these thoughts) from other thoughts adventitious or factitious, I termed the former 'innate'. In the same sense we say that in some families generosity is innate, in others certain diseases like gout or gravel, not that on this account the babies of these families suffer from these diseases in their mother's womb, but because they are born with a certain disposition or propensity for contracting them. (442)

Here, he says that ideas and concepts are innate and that

they form the capacity of thinking. This same point is made two pages later:

> And surely it is manifest to every man that sight, of itself and by its proper function, presents nothing beyond pictures, and hearing nothing beyond voices or sounds, so that all these things that we think of, beyond these voices or pictures, as being symbolised by them, are presented to us by means of ideas which come from no other source than our faculty of thinking, and are accordingly together with that faculty innate in us, that is, always existing in us potentially; for existence in any faculty is not actual but merely potential existence, since the very word 'faculty' designates nothing more or less than a potentiality. (444)

Descartes' conception of visual perception has been proved correct to a very large extent during the last 25 years. David Hubel and Torsten Wiesel received a Noble Prize in 1981 for their work on the neurological basis of visual perception which showed that the brain is endowed with neuronal circuits at birth which channel the input of the senses already in predetermined forms, cf. Hubel/Wiesel (1962, 1978). Cf. also the remark by the psychologist Jacques Mehler who sums up a discussion of recent findings in human biology and psychology: "One can no longer argue that the human infant is a tabula rasa without innate dispositions, curiosity and capabilities" (in Piatelli-Palma- rini (1980, 349).

Moreover, these innate ideas for the analysis of external experience are quite specific:

> Hence it follows that the ideas of the movements and figures are themselves innate in us. So much the more must the ideas of pain, colour, sound and the like be innate, that our mind may, on occasion of certain corporeal movements, envisage these ideas, for they have no likeness to the posterous than that all common notions which are inherent in our mind should arise from these movements, and should be incapable of existing without them? I should like our friend to instruct me as to what corporeal movement it is which can form in our mind any common notion, e.g. the notion that 'things which are equal to the same thing are equal to one another', or any other he pleases; for all

these movements are particular, but notions are universal having no affinity with movements and no relation to them. (443)

On the other hand Descartes claims that "I persuaded myself easily that I had no idea in my mind which had not formerly come to me through the senses". (188). This seems to directly contradict all the other claims about innate ideas in his writings. I do not see at this point how to resolve the contradiction.

9. Not everybody seems to have (had) such an idea, however. We will try to show some empathy and will just follow Descartes' meditation, as if our minds were connected to his.

C H A P T E R II

DESCARTES ON BEASTS AND HUMAN BEINGS

2.1 The Text

In the Discourse, Descartes engages in a
discussion about the difference between humans and
animals. His characterization of the faculties of animals
is as follows:

> Here I specially stopped to show that if there
> had been such machines, possessing the organs
> and outward form of a monkey or some other
> animal without reason, we should not have had
> any means of ascertaining that they were not of
> the same nature as those animals. On the other
> hand, if there were machines which bore a
> resemblance to our body and imitated our actions
> as far as it was morally possible to do so, we
> should always have two very certain tests by
> which to recognise that, for all that, they were
> not real men. The first is, that they could
> never use speech or other signs as we do when
> placing our thoughts on record for the benefit
> of others. For we can easily understand a
> machine's being constituted so that it can utter
> words, and even emit some responses to action on
> it of a corporeal kind, which brings about a
> change in its organs; for instance, if it is
> touched in a particular part it may ask what we
> wish to say to it; if in another part it may
> exclaim that it is being hurt, and so on. But it
> never happens that it arranges its speech in
> various ways, in order to reply appropriately
> to everything that may be said in its presence,
> as even the lowest type of man can do. And the

second difference is, that although machines can
perform certain things as well as or perhaps
better than any of us can do, they infallibly
fall short in others, by which means we may
discover that they did not act from knowledge,
but only from the disposition of their organs.
For while reason is a universal instrument which
can serve for all contingencies, these organs
have need for some special adaptation for every
particular action. From this it follows that it
is morally impossible that there should be
sufficient diversity in any machine to allow it
to act in all the events of life in the same way
as our reason causes us to act.

Animals thus differ radically from humans in their

capacities, as we look at humans from the following

perspective:

For it is a very remarkable fact that there are
none so depraved and stupid, without even
excepting idiots, that they cannot arrange
different words together, forming of them a
statement by which they make known their
thoughts; while, on the other hand, there is no
other animal, however perfect and fortunately
circumstanced it may be, which can do the same.
It is not the want of organs that brings this to
pass, for it is evident that magpies and parrots
are able to utter words just like ourselves, and
yet they cannot speak as we do, that is, so as
to give evidence that they think of what they
say.[1]

A potential counterargument has to be discussed,

before we can make conclusions on the basis of the

linguistic difference between humans and beasts:

And we ought not to confound speech with natural
movements which betray passions and may be
imitated by machines as well as be manisfested

by animals; nor must we think, as did some of
the ancients, that brutes talk, although we do
not understand their language. For if this were
true, since they have many organs which are
allied to our own, they could communicate their
thoughts to us just as easily as to those of
their own race.

Only at this point of the discussion does

Descartes give us the rationale for his discussion of the

differences in the use of language noted between for

example apes and human beings:

there is none [error] which is more effectual in
leading feeble spirits from the straight path of
virtue, than to imagine that the soul of the
brute is of the same nature as our own, and that
in consequence, after this life we have nothing
to fear or to hope for, any more than the flies
and ants. As a matter of fact, when one comes to
know how greatly they differ, we understand much
better the reasons which go to prove that our
soul is in its nature entirely independent of
the body, and in consequence that it is not
liable to die with it.

The language argument is thus supposed to support

another one of Descartes' claims, namely the claim that

mind and body are separated from each other in humans and

that the mind - unlike the body - is immortal. Cartesian

dualism is based on the conception that bodies, of humans

and beasts, are machines whose behavior is explicable in

purely mechanistic terms. This comes out quite clearly in

the following paragraph taken from a letter from Descartes

to the Marquess of Newcastle:

> But I observe that they [the beasts; G.W.] only
> imitate or surpass us in those of our actions
> which are not guided by our thoughts ... In
> fact, none of our external actions can show
> anyone who examines them that our body is not
> just a self-moving machine but contains a soul
> with thoughts, with the exception of words, or
> other signs that are relevant to particular
> topics without expressing any passion.

Beasts do not show any behavior, however, which
would force one to engage in an explanation that goes
beyond the mechanism involved in the physical movements of
humans and beasts. In particular we do not find any
behavior that forces us to postulate thought in animals.
Once this result is established it follows
straightforwardly from the results obtained in the Second
Mediatation that animals cannot have an immortal soul
(mind), because the essence of the soul is thinking. In
other words, whatever has a soul should therefore be
thinking (in the broad sense of the notion as it is used
by Descartes), and by modus tollens it follows that animals
cannot have a soul, if they do not have thoughts:

> Similarly, all the things which dogs, horses,
> and monkeys are taught to perform are only
> expressions of their fear, their hope, or their
> joy; and consequently they can be performed
> without any thought. Now it seems to me very
> striking that the use of words, so defined is
> something peculiar to human beings ... But there
> has never been known an animal so perfect as to
> use a sign to make other animals understand
> something which expressed no passion ... This
> seems to me a very strong argument to prove that

the reason why animals do not speak as we do is
not that they lack the organs but that they have
no thoughts.

This is the textual evidence that we will base our
discussion on in this section. I will now try to give a
more formal representation of the argument, in order to
bring out its logical form. This will be of help to us in
the upcoming discussion about the claims made by Descartes
and their philosophical and empirical foundations.

2.2 The Argument

From now on I will assume that due to the textual
evidence given in the last subsection we are justified in
attributing belief in the following proposition to
Descartes:

(A) for all X (X can pass the language test iff X has a
    rational mind)

On the basis of (A) we can also attribute the
following propositions to Descartes:

(B) for all X (if X can pass the language test then X has
    a rational mind)

(C) for all X (if X has a rational mind then X can pass
    the language test)

      We will refer to (B) as "Descartes' discovery
procedure for minds".

      Before we go into the details of the argument
about the language test, we have to mention one
presupposition of the argument, namely: the argument for
the human mind presupposes the assumption that there is a
physiological parallel between man's articulatory
faculties and those of animals. That is why Descartes
brings the argument concerning the parrots. From the
behavior of those animals we can conclude that no
mechanical failure on the side of the animals is
responsible for their failure to pass the language test,
for these beasts are evidently able to imitate man's
articulatory behavior to large enough an extent for them
to be able to pass the language test as far as basic
physiological requirements go.[2]

      I will now give the structure of Descartes'
argument that there is a difference between humans and
animals in two versions, from two different perspectives,
as well as I understand it:

      Descartes argues that since no animal can pass the

language test, no animal has a rational mind. The
test is supposed to prove that animals do not possess
a faculty (language) which presupposes thought. But
since thought is the essence of the human mind, humans are
essentially different from animals. Ultimately, the
language test is an argument for Cartesian dualism.

Or, from a different perspective: Descartes
presupposes that the linguistic differences between beasts
and humans are not due to physiological constraints of
beasts, since there are beasts which can utter words etc.
and on the other hand there are humans (mutes) who cannot
speak but still use language. Furthermore, the behavior of
animals and the behavior of humans not dependent on
thought can possibly by imitated by a complicated machine,
i.e. in a mechanistic fashion. But since the human faculty
for speech is creative (i.e. not dependent on specific
dispositions), no mechanistic explanation for this
behavior will be possible. The difference between animals
and humans thus cannot reduce to a difference in
mechanical complexity, i.e. a quantitative difference. The
difference thus has to be qualitative, i.e. due to a new
substance in man, which Descartes calls mind.

Given this outline of the argument I will now turn
to a discussion of a set of empirical facts concerning

human language and animal communication systems. The
questions I will try to find an answer to are: Is there
any reason to believe that (A) (and hence (B) which
follows from it) is true? Depending on the answer to this
question, what would count as empirical evidence one way
or the other? Furthermore, what are the truth conditions
for the antecedent of Descartes' discovery procedure for
minds, i.e. under what conditions would we say that an
object X can pass the language test? This latter question
is of particular importance, when we try to apply the
language test to some arbitrary object, i.e. an infant of
three weeks of age, a computer of the latest generation,
animals, the tape recorder of the phone directory etc.

2.3 Language

We will begin this section with a discussion of
certain facts about animal communication systems which
might call into question Descartes' claim that the
language test is a sufficient condition for an object to
qualify as a bearer of a rational mind. I will first
describe in some detail the linguistic capabilities of two
apes, Washoe and Sarah. These capabilities we will then
compare with the Cartesian claims made in the quotes given
in section 1. above. Furthermore, it will become clear

that we will need criteria for a decision whether some object passes the language test or not.[3]

Washoe is a chimpanzee who was taught language by the two psychologists R.A. Gardner and B.T. Gardner. The language taught was a rudimentary version of American Sign Language (ASL), since the articulatory organs of apes make them incapable of acquiring and using language through the auditory-vocal channel. The earliest stages of Washoe's language acquisition were reportedly similar to those of a young human child. Washoe acquired more than one hundred linguistic signs (words) and used two and three-word utterances. The ape never acquired the word-order restrictions of the language taught, but reportedly showed a remarkable creativity through the invention of new words, like "water-bird" for a duck etc. To sum up: Washoe never acquired word order restrictions and sentences with more than three words; her language did not show any signs of structure dependence (cf. discussion below), and she herself did not display any drive to communicate once she had been released to an ape colony.

Sarah was a chimpanzee under the supervision of David Premack. She was kept in a cage and was trained with methods similar to Skinner's experiments with rats. Her "words" consisted of little colored metal plates of

different shapes. A red quadrangle, for example, meant
"banana" etc. Sarah was able to acquire more than one
hundred such words and was able to follow among others
if-then statements, like "if apple, then chocolate", i.e.
you will get chocolate (her favorite food, used as a
reinforcement), only if you take the apple first. Sarah
never started conversations and was just tested in her cage,
being drilled very carefully for very specific responses.
The sign system that Sarah was able to acquire was also
taught successfully to heavily mentally disturbed human
children who had been incapable of acquiring human
language. To sum up: Sarah, like Washoe, was able to
acquire more than one hundred signs after several years of
extensive drilling with reinforcement. Sarah's
communication displayed a certain amount of creativity,
but she never started a conversation on her own.[4]

On the basis of these empirical facts about two
relatively sophisticated systems of animal communication
we can now return to Descartes' claims about the
linguistic capabilities of animals on which the arguments
for a mechanistic explanation of all animal behavior and
the existence of the human mind are based.

In the Discourse we find for example the claim
that an animal-machine "could never arrange its words

differently so as to answer to the sense of all that is said in its presence, which is somethig even the most backward men can do". It seems to me that we are not forced to refine this judgement on the basis of the linguistic performance of the two apes discussed, even if the ape's performance might have been more sophisticated than one might have expected. If their behavior is qualitatively analogous to the highest degree of sophistication that animal communication systems are able to attain, then the high level of creativity and flexibility required by Descartes is certainly beyond their reach. But the claim made by Descartes a few lines down in the Discourse seems no longer tenable, given the evidence from Washoe and Sarah: "For it is very remarkable that there are no men so backward and so stupid ... who are unable to arrange various words and to put together discourse through which they make their thoughts understood; but on the other hand, there is no other animal, perfect and well bred as it may be, that can do likewise." The latter sentence is certainly false. Although the animals we were looking at were not really active communicants in the sense that they were looking for communication and started conversations, still it cannot be denied that both Washoe and Sarah were capable of arranging "various words and to put together

discourse".5

    I think that the evidence from Washoe and Sarah
also does not force us to accept the claim that "animals
speak, although we do not understand their language",
although we might try to establish a better rationale for
the rejection of this claim than the one given by
Descartes, who just says that since animals and humans
share several organs, humans should also be able to
understand animals' speech, if animals are able to
understand each other. It seems to me that the obvious
argument for this conclusion is clearly invalid. From the
fact that two computers have the same hardware it
certainly doesn't follow that a command given to one
computer has the same effect as if it were given to the
other one, for the two computers might be run with
different software, one of which is compatible with the
specific command, while the other one isn't, or if both
are compatible with the command, still the command might
lead to different effects depending on the software of the
computer. The whole issue obviously centers around the
meaning of the word "speak". Of course one can impose such
a general meaning onto this word that almost every
behavior falls under the concept, like scratching one's
head or losing leaves in the case of a tree. I admit that

it is a matter of taste what one takes to be the defining characteristics of speech, after all one already hears sentences like "this machine speaks" etc., but I am rather sympathetic with a concern articulated by David Premack:

.

> We find considerable evidence for
> representational capacity, for the ape's ability
> to use one thing to stand for another, and even
> some evidence for spontaneous symbolization. But
> we find very little of the latter, and it is
> troublesome for me to find the evidence for the
> existence of a capacity along with so little
> evidence for the use of the capacity.
> (Piattelli-Palmarini 1980, 180f)

In a sense Premack's concern is not relevant, since not making use of a capacity does not mean that one doesn't have the capacity. For example, I assume that all healthy humans have the capacity to stand on a chair with one leg while putting the right hand at the left ear. Despite this principled capability one hardly sees humans make use of this capacity, at least I haven't seen any so far. The reason for this might be that humans just do not feel a need for exploiting this capacity, and the same seems to be true for chimpanzees as far as their capacity to forms strings of words is concerned: it seems they just do not feel a need to use their capacity and there is no principled reason why they should do so, according to Premack:

> People emphasize social communication in
> discussing language, yet social communication
> can get on nicely without language. (op cit)

I believe that this point strongly supports my claim in
the last footnote that the ability to speak, if one
chooses to call it that, in chimpanzees is of a quite
different quality than in humans. Humans feel the need to
use language, indeed we can quote the psychologist Jacques
Mehler saying that language is "the characteristic
instrument of mankind", it is a fundamental aspect of
human nature. Even if one accepts that chimpanzees share
with severely aphasic humans the capacity of very basic
semiotic and referential acts, still there is an
unbridgeable qualitative gap between the language use of
humans and that of higher primates.

Having discussed the status of the chimpanzees'
linguistic performance, we should now return to a
discussion of the proposition (B) that we attributed to
Descartes. I repeat the proposition here for convenience:

(B) for all X (if X can pass the language test, then X has
    a rational mind)

We can certainly give an instantiation of (B),
where Washoe or Sarah is put into the sentence for the

variable X:

(B') if Washoe can pass the language test, then Washoe has
        a rational mind

What we are interested in, of course, is whether from (B')
we can conclude (D):

(D) Washoe has a rational mind

by modus ponens applied to (B') and the antecedent of
(B'). If (B') and the antecedent of (B') are true, then
(D) follows. We had assumed that Descartes would hold (B)
and we can assume that he would hold its instantiation
(B'). But would he hold that the antecedent of (B') is
true? The problem is difficult to solve, since he does not
give any criteria for when an object has the property of
passing the language test. For him, this seems to have
been an intuitive decision, i.e. I suspect that when
pressed for such criteria he would have replied that he
considered X to have passed the language test, if he saw
clearly and distinctly that this object was using
language. And for Descartes everything that he saw clearly
and distincly was true, as proved at the end of the Fifth
Meditation.

The problem here is of course that it is far from clear from an a priori point of view, whether Washoe is using language or not. The intuitive decision is not of much help, since as Leibnitz remarked, we do not have clear criteria for when we see something clearly and distinctly either, so that we never get out of the vicious circle.

To get out of this dilemma, I now want to discuss a list of properties which have been taken to be essential to human language. We will filter out certain of the properties, since they do not really qualify for essential properties of human language but will then apply these properties to the structure of the sign systems and the use they were put to by Sarah and Washoe. We will also give examples of natural animal communication systems which share certain of the properties with human language. By 'natural systems' I means systems which were not taught to animals by humans in laboratory experiments and did not involve artificial languages invented by humans specifically for these or other means. We will not find any such system, however, that shares all the properties with human language.

Hockett (1963) has proposed several essential properties of human language. We will pick out some of these properties and discuss their relevance. The

properties are the following:

e) vocal-auditory channel
f) arbitrariness of signs/convention
g) semanticity
h) cultural transmission
i) displacement
k) duality
l) structure-dependence
m) creativity

The first property that is attributed to human language is the use of the vocal-auditory channel. But we do not even have to check whether non-human communication systems have this property, since this can hardly be claimed to be an essential property even for human language. We can remember that already Descartes takes into account usage of sign systems by human mutes. If we would attribute a high degree of relevance to the vocal-auditory channel, then we would have to make special and I believe counterintuitive assumptions about users of American Sign Language etc. I will not pursue this track then and will not base any argument on this first property of human language.

The second property refers to a property of the information carrying units of the language, the signs. It has been known for a long time that the sign is composed of two entities, a form and a substance. In the Cartesian tradition Arnauld, for example, gives exactly this analysis of the sign in the Port-Royal logic. But he goes

on:

> Signs may be divided into natural signs and
> conventional signs. Natural signs do not depend
> on the whim of man - an image in a mirror is a
> natural sign of the person mirrored. A
> conventional sign is a sign established by
> convention and may, but need not, have any
> connection with the thing signified. Words are
> conventional signs of thoughts, and written
> characters are conventional signs of words.
> (Arnauld (1964, 47))

The important insight of this paragraph may
perhaps best be illustrated with an example. Take the
English word "boot". This word consists of one morpheme
(smallest meaningful linguistic unit) which consists of an
ordered set of three phonemes (smallest distinctive sound
unit), namely /b/, /u/ and /t/. But there is is no
intrinsic relationship between the meaning of the word
"boot" and this specific ordered set of phonemes. The
English speech community might as well have chosen a
different set of phonemes to make up the morpheme and the
word "boot", or might have imposed a different order on
the phonemes, i.e. /tub/ rather than /but/. Another way to
demonstrate that the relationship between the form of a
sign and its content is arbitrary is to give the different
forms of synonymous signs in different languages: German
for example does not use the phoneme sequence /but/ to
signal the content of the English word /but/, but rather

uses the phoneme sequence /stifl/, which is neither more
nor less suited to signal the meaning of the two words
than its English analogue. And if we go to other languages
we will presumably find again different phoneme sequences
for the same content. This is what we mean by
"arbitrariness of signs".6

The arbitrariness of signs may or may not be due to
convention. The signs of human languages are to a large
extent conventional in the sense that specific
form-content relationships are not part of the biological
endowment of human beings. That /but/ in English and
/stifl/ in German stand for the same sign content,
excludes the claim that maybe the relationship between the
meaning of /but/ and the form it is correlated with in one
language is innate. Rather each speech community agrees in
correlating the respective form with a certain content (in
this case the content of /but/ and /stifl/), and thus
brings into existence a convention. We will see in a
moment that there are animal communication systems whose
signs are arbitrary but not conventional.

   We now have to ask ourselves whether we know of
animal communication systems whose signs have the property
of arbitrariness and if there are such systems, what the
source of the arbitrariness is. The first question seems

to require a clear yes. Doves communicate with each other
through bodily movements and gestures and the relationship
between the form of the gestures and their content is
arbitrary, as far as we know. So, in order to express
agressivity doves turn away from their enemy and start
picking grass with their beak. This is a sign as good as
any and it is certainly not obvious why turning away from
one's enemy and starting to pick grass signals agressivity
rather than shyness, hunger or unwillingness to fight.
Dove communication thus seems to satisfy the property
"arbitrariness of signs" that we have attributed to human
languages. But does it also satisfy the requirement that
the signs are conventional; in other words, is it
thinkable that different dove communities chose different
forms of signs for the same content in analogy to the
English speech community's choosing /but/ to signal the
content of this sign whereas the German speech community
chooses /stifl/? This does not seem to be the case. The
signs that we find in natural animal communication systems
(i.e. systems not taught to animals in the laboratory, but
rather systems used in freedom without artificial
drilling and reinforcement) seem to be species-universal,
i.e. non-conventional; at least I am not familiar with a
single description of an example in the literature on
natural animal communication which would posit, for

example, different warning cries for the same danger within one species. If this is correct and further research in this area does not unearth examples like this, then we have found a first distinctive diagnostic for human languages, namely convention.

The third property assigned to human language is "semanticity", i.e. the fact that signs contain meaning and the exchange of such signs conveys information, for example sentences can be true or false. That natural languages have this property is obvious and no further discussion is called for. But animal systems might also have this property. We saw above in the discussion of arbitrariness that the dove gestures have a certain content, namely agressivity. At this point we might be tempted to reformulate Hockett's property slightly by requiring that the semantic content of the signs used has to be variable in certain ways, i.e. agressivity (which just means "I am agressive now and here") is not abstract enough a content, for it only refers to a behavioral state of the signaling animal, but agressivity can not be said to be true or false. I am trying to make Hockett's requirement stricter for the following reason: Imagine a Martian scientist coming down to earth, not knowing that the entities on this planet fall into two classes, i.e. the organic and the inorganic parts of the world. Then

imagine that the Martian observes that the sky is
sometimes without clouds and is sometimes filled with
clouds. Furthermore, most of the time that the sky has
been filled with clouds, it started to rain afterwards.
The Martian scientist will, if s/he (or it?) is rational,
postulate a causal chain between the two states of
affairs, i.e. the fact that the sky is cloudy and the fact
that it starts to rain afterwards. He might thus take the
cloudy sky for a sign of potential upcoming rain. We may
further assume that the Martian at some point comes to
investigate doves, although he doesn't know that these
entities belong to the organic part of the world. Suppose
that the doves are displeased by the outlook of the
Martian which makes them agressive every time he
approaches them. He will then notice that each time he
approaches a dove it turns away from him and starts to
pick grass with its beak. Given that at first he doesn't
know how to interpret this behavior he moves toward the
dove and tries to touch it. But most of time he is then
attacked by the agressive dove, which tries to peck him
with its beak and to scratch him. Again, if he is rational
he might contruct a causal chain between the dove's first
turning away from him and picking grass with its beak and
then attacking him. In this sense the first behavior of
the dove might be taken as a sign for what is to come, in

the same way that the cloudiness of the sky is a sign of upcoming rain. If we now come back to our property of semanticity, we see that the dove's behavior is not really semantic in any interesting sense, or at least not in a more interesting sense than the cloudiness of the sky. The signs used by the dove are only semantic in a causally behavioral sense, but human languages are of course semantic in a much more extended sense. Take the following trivial example: "The sky is blue". This sentence has a meaning independent of any behavioral criteria and it can be true or false. I can utter this sentence in a conversation about colors or when I am talking about the flowers in my garden or when I want to check how long it takes me to utter a meaningful sentence with four syllables. In none of these cases is the meaning of the complex sign in any way related (or at least does not have to be related) to behavior, neither mine nor anybody else's.

If we turn to the bee dance with its increased creativity relative to dove gestures, it seems we still do not find semanticity comparable in any sense to that we witness in human languages. I would interpret the semantics of the bee dance in the following fashion, analogous to the expressions of doves and the cloud example: "If you fly into this direction about that far,

then you will find food". If this is the correct
interpretation of the signal given by the dancing bee,
then we see again that this act of communication is just
the correlation of two states of affairs, i.e. the
behavior of two objects in the world, here the other bees
looking for food and the blossom carrying food. As far as
we know information that is not linked to behavioral
dispositions is not expressed by bee language and
presumably for principled reasons: it is not
expressible.[7]

If all this is true, then we have found a second
property of human languages which is not found in animal
communication systems.

Cultural transmission is very closely related to
the problem of convention. If the relationship between
linguistic form and linguistic meaning is conventional,
then it can change, either because one generation changes
it or because later generations slightly modify the
conventions passed on to them by earlier generations, for
example, to accomodate them to their more modern needs. We
can thus assume that those aspects of human language which
are conventional are open to change through time and we
know well that this is true. English and High German, for
example, are different in that High German underwent the

second Germanic sound shift whereas English was not
affected by this rule change. West Germanic thus developed
in two different fashions in the Germanic generations who
lived from 500 - 800 after Christ depending on the
geographical distribution of the Germanic peoples.

It is hard to settle the question whether animal
communication shows cultural transmission in this sense.
What comes closest to fullfilling the relevant conditions
is a species of song birds with a species-specific song.
If this song is not entirely innate (i.e. birds raised in
isolation can perform the song), but the young bird needs
to hear the song from other members of the species before
it can sing the song, then this is certainly a kind of
cultural transmission. This case might still not be
entirely convincing, since one would also like to know
whether the different generations can make slight changes
in the structure of the song melody. In other words: do we
find historical sound change in bird songs? If we do, then
I think we are dealing with a case of cultural
transmission, if we don't however, then I think the
question is still open. Since I am not familiar with any
evidence one way or the other, I will simply leave the
question open.

We now turn to the issue of displacement. By this
we mean the property of every human communication system

that allows its user to talk about objects and events which are not related to the speakers, the place and the time of the current speech act, i.e. the existence of sentences like the following: "If my brother went to New York tomorrow, I might meet Bill" or "Life on the Earth must have been pretty unpleasant two billion years ago".

Displacement seems to be unique to human language. We are not familiar with any natural animal communication system that allows animals to transfer information that is not linked to the communicants, the location of the communication and the time of the act of communication. The dove gestures are linked to behavioral dispositions depending on the individual dove, the time and place of the gesture, i.e. no dove can signal the fact that some other dove is agressive etc. The warning cries of birds and apes are linked closely to the location and the time of the cry (although the chimpanzee Sarah made "utterances" about objects not linked closely to the location of the communication in experimental situations (Premack: "Sarah was capable of displacement")), we do not seem to find cries signaling the fact that three weeks ago an enemy was approaching, or a cry telling the mates of the warner that his mother was once attacked by some vicious enemy. Bird songs, to the extent that they show semanticity, are also closely linked to the time of the

communicative act, at least we haven't heard of cries
making it known that the communicant once was looking for
a female to found a family. For all these reasons
displacement can be used as a true and interesting
diagnostic for human communication systems.

Duality is a property of the structure of human
language rather than of the use of language, like
displacement. It embodies the idea that in the hierarchy
of linguistic units there exists a level below which
significant units are no longer composed of meaningful
units. Thus, whereas sentences of natural languages are
sets of phrases, which are meaningful, and phrases are
sets of words and words have meaning, the units that words
themselves are composed of are in fact the smallest
meaningful linguistic units. These units are commonly
referred to as 'morphemes' and as was mentioned above ,
the phoneme is defined as the smallest distinctive sound
unit of language (this is only one of the definitions
around, but it does its job as well as others). There
exists an interesting relationship between the hierarchy
of linguistic units and their frequency, i.e. the phoneme
inventory which is relatively low on the hierarchy is
finite and in fact quite small: in natural language we do
not find more than one hundred phonemes. The elements
composed out of phonemes, the morphemes are more numerous

than the first, there are several thousand, but it seems not more than ten thousand. From then on the language is enriched by productive word and phrase formation rules which ensure that there are infinitely many words, phrases and sentences in every human language. By duality we thus mean the fact about human language that there is a level in the hierarchy of linguistic building blocks where we move from signs to non-signs, i.e. there is a lowest level of significant units which is no longer composed of significant units and the latter class of non-significant units is very small.

It is not obvious whether we should attribute duality to animal communication systems. Can we say, for example, that the melody of a bird song that is composed of meaningless units (the individual tones) is itself a meaningful unit? Do we find anything in the bird song melody that resembles the highly articulated structures of phrases of human languages, let alone the hierarchy of units forming the whole? Do we find a frequency hierarchy? The same questions come up in connection with the bee dance. Everybody who observes the bee dance is thrilled by its relevance and its social coordination, but is there any remarkable similarity between the structure of bee dance communication and the structure of human language? Would we want to say that the different movements of the

dancing bee are meaningless, but that the composition of
the movements is transferring information. I guess we
would be inclined to do so. But we do not seem to find
any hierarchy of meaningful units with clear rules of how
to produce larger units, with a corresponding absence of a
frequency hierarchy. In fact, upon closer investigation it
seems clear that the expressibility of bee "language" is
not too rich after all, since the amount of different
pieces of information expressible in bee language is
actually quite small. Abstracting away from the trivial
fact that the number of directions in which one bee can
send the others is of course theoretically infinite, the
variation of information expressible in bee language is
highly restricted. We will come back to this question when
we discuss structure dependence. To sum up the discussion
we can say that we do find modest duality in some animal
systems, but that the amount of duality compared to the
linguistic systems used by humans is rather restricted.

Another structural property inherent in human
languages is structure dependence itself. By this we mean
the fact that rules of natural languages do not seem to be
defined on the basis of strings of words found in a
phonetic string, but rather over abstract phrases defining
the highly articulated internal structure of sentences of
human languages. We can demonstrate structure dependence

with an example similar to the ones Chomsky has used
during the last twenty years to argue for the concept.
Imagine a human child and a Martian visitor trying to
aquire English on the basis of listening to every-day
linguistic material around them and uttering such material
themselves. This essentially is the task of language
acquisition that most human children undergo successfully,
i.e. the child (unlike Washoe and Sarah) is not under
constant supervision of his parents or even psychologists
in his/her utterances and no intensive training with
reinforcement etc. is going on. Imagine now that the child
and the Martian who, for simplicity, we can assume to be
exposed to exactly the same linguistic data, hear a
sentence like the following:

(M) The dog is sick

Our speakers might know that this is a declarative
sentence, i.e. a sentence expressing a statement.
Furthermore, it is reasonable to assume that both notice a
similarity both in meaning and in structure to the
sentence

(N) Is the dog sick?

We know it to be an empirical fact that children know
quite early the difference between a statement and a
question. At some point in the language acquisition
process we can thus presuppose the knowledge that (N) is
the question inquiring whether (M) is true. Since the
child is certainly aware of other such example pairs,
he/she as well as our poor Martian will try to formulate a
rule that relates sentences like (M) and (N), since he/she
cannot store all the infinitely many pairs like (M) and
(N) in his/her finite memory. If one assumes that the
child and the Martian learn language inductively, then one
will assume that both will (unconsciously) formulate
certain hypotheses about the relationship between (M) and
(N). The simplest hypothesis compatible with (M,N) is
certainly (H):

(H) The yes-no question a belonging to a declarative
    sentence b is exacly like b with one exception: the
    first finite verb in b appears as the initial verb of
    the question a

We can compare (H) with a more complicated hypothesis,
namely (H'):

(H') The yes-no question a belonging to a declarative

sentence b is exactly like b with one exception:
the first finite verb <u>after</u> <u>the</u> <u>first</u> <u>noun</u> <u>phrase</u>
<u>in</u> <u>b</u> appears as the initial verb of the question a

(H') differs from (H) in that the underlined
phrase is added. This clearly makes the second hypothesis
more complicated than the first one. (H) and (H') differ
radically in what they require from a language learner.
The first rule just requires the learner to identify the
first finite verb of the sentence (which is already a
non-trivial task, but we will ignore this question here),
that is all. The second condition requires much more. It
requires a structural analysis of (M), because in the
underlined expression reference is made to the first noun
phrase of the declarative sentence. But a noun phrase is
an abstract unit of sentence structure that does not
correlate with anything in the sound wave carrying for
example (M). A linear sequence of words without an abract
structure imposed on it is thus not going to help the
language learner to apply rule (H') correctly.

I have stressed the fact that hypothesis (H') is
more complex than hypothesis (H). In fact, this increased
complexity is warranted, however, since (H') is the
correct generalization about the relation between
sentences like (M) and (N). This can be shown with the

following examples which are slightly more complicated
than (M) and (N):

(O) The dog that is lying under the table is sick

The correct yes-no question belonging to (O) is (P') which
is in accord with (H') and not (P) as predicted by (H):

(P) Is the dog that __ lying under the table is sick?
(P') Is the dog that is lying under the table __ sick?

The dashes in the two versions of (P) mark the positions
that (H) and (H') identify as the first finite verb
with the qualification in (H') that the first finite verb
after the first noun phrase is meant. We can now conclude
that from a purely inductive point of view, without the
presupposition that the sentences of human languages have
highly articulated abstract structures, it would not be
irrational to postulate the simpler hypothesis (H) before
the more complicated (H'). Only after (H) is falsified,
would one expect a language learner not equipped with the
knowledge about structure to postulate (H'). We would thus
have some reason to believe that our rational Martian
friend in his inductive trial-and-error search for the
rules of English would utter incorrect sentences like (P).

However, this is not what we find with human children. According to the results of a recent experiment by Crain and Nakayama (cf. Crain/Nakayama 1984) children never make mistakes like (P). More than 60 children down to a very small age have been tested and no utterances like (P) could be detected. From this Chomsky concludes that it is part of the linguistic faculty of man, i.e. Universal Grammar, that all rules of natural language are structure-dependent. That is to say: we do not find rules of natural language syntax which are defined in terms of unstructured strings of linguistic objects.

Turning to animal communication again, we may note that no system is known to us whose rules are structure-dependent in the sense just discussed. Bird songs and warning cries of apes do not display anything like the structural descriptions in (H'), indeed the information units in these systems do not seem to consist of hierarchically structured smaller building blocks at all. A compositionality principle for these systems is thus not required. Moreover, it is not even easy to see why the animal systems should contain structure-dependence in the first place, since structure-dependence is a property of rules of grammar. Grammars of human languages will require this property, since they contain rules, which apply to strings of words with structure

superimposed on them. It is not equally plausible to
assume that animal systems contain rules in the first
place. At least I would be very startled to learn that an
animal system had been detected in which we find pairs
like (M) and (N) in the first place. In other words: the
systems we are talking about seem to be so rigid, that
they do not allow alternations like statement - question
etc. The bee dance does not seem to invoke a question -
answer sequence, i.e. an incoming bee isn't confronted
with a dance signaling the question: "Did you find an
interesting flower in the vicinity of the hive and what's
its color?". The only illocutionary acts that bees are
capable of seem to be statements. Questions, commands,
exclamations, promisses, desires and all the other acts
that human languages have special signalling functions for
in their grammatical storage are simply lacking. But then
there is also no reason to expect the very complex and
fascinating alternations in these systems that we find in
human languages and no reason why rules should exist in
the systems. The absence of structure dependence may thus
be due to the inherent communicative rigidity of the
systems under discussion. We will pursue this point in the
discussion of the next property, creativity.

The explosive creativity is one of the most
fascinating and most important aspects of human language.

If human languages consisted of a finite amount of
structures that could be stored in the memory of each
speaker, like, for example, the 64 syllogisms or the
multiplication table of integers smaller than or equal to
10, then human language would not be very interesting from
a scientific point of view and it would also lose its
importance for the human race as the vehicle of social
interaction, cultural transmission and the expression of
thought. With its infinitely many phrases and sentences
human languages are capable of expressing infinitely many
different thoughts. To give just one illustrative example.
Imagine a child is able to utter a sentence type like the
following: "Yesterday the old man hit the young dog hard"
and for each of the words in the sentence knows just nine
other words that could be substituted for this word. The
child will thus know 60 words, the vocabulary of a normal
human child under 3 years of age. With this very small
grammar the child will be able to utter almost one billion
different sentences!

One should not believe that the fact that the
dancing bee is also theoretically able to perform
infinitely many different dances (because one component of
the dance signals the angle with respect to the sun in
which the food will be found - of course there are
infinitely many such angles in theory) is relevant here.

First of all, it is almost certain that the bees receiving
the information cannot distinguish between increasingly
similar angles, once, because it is dark in the hive
anyway and the receiving bees have to sense the structure
of the dance with their feelers, second because it is very
doubtful that the feelers can make such fine distinctions.
For all practical purposes there will thus be a very small
number of unprecise messages conveyed by the dancing bee.
To mention just one interesting fact: bee language does
not have word a for "above": a bucket of sugar water put on
the hive of bee colony will not be accessible to the bee
swarm, since bees returning from the bucket into the hive
are unable to communicate the exact position of the
bucket. They signal that the food source is in the
vicinity of the hive, but, since there are no flowers in
the sky, the innate bee language vocabulary just lacks the
word "above". The swarm will fly around in the vicinity of
the hive for hours looking for the rich source, but will
be unable to locate it on the basis of the directions.

Human languages differ fundamentally in this
respect. The child we attributed the very restricted
grammar to not only can distinguish each of the one
billion sentences, s/he will also be able to judge that
each of these sentences is grammatical and will be able to
compute the meaning of each of these completely novel

sentences without having heard it before. Moreover, human children not only perceive and understand new and unheard utterances all the time, they also compose new and unheard sentences constantly, not only by filling in different words into structures they have mastered (i.e. not just by induction), but also by inventing new structures on the basis of old structures that they have mastered, for example, by composing two sub-structures into one new structure etc. This amount of innovative creativity seems to be entirely absent from all the animal communication systems that we know at this point. A young bee cannot just come along and add some personal note to a given dance; the structure of the dance is entirely rigid, the different steps are already programmed into the bee at birth and creation and innovation are impossible.

After this rather long fact-finding excursion let us now return to Descartes' language test and the criteria for passing it. Rather than relying on our intuition, we now have a set of clear and distinct diagnostics for "X can pass the language test": let us refer to the set of properties discussed which are essential of human language as k. Then we can say:

(E) for all X (X passes the language test iff X

systematically displays behavior having the
properties k)

(E) incorporates the truth conditions for the
antecedent of (B) above. The conjunction of (E) and (B)
should therefore enable us to determine for every object
in the world, whether it has a rational mind or not. But
at this point we have to be very careful. We have to ask
the question whether we can really trust (B) and its
strengthened form in (A). I believe we have made precise
the truth conditions for the antecedent of (B), and this
is a first step toward a better understanding of (B) as a
whole. But what about the truth conditions of the
consequent? If we have found an object which makes (E)
true by systematically displaying behavior with the
properties k, an object ipso facto making the antecedent
of (B) true as well, what is it that we are predicating of
the object by claiming that it has a rational mind? Can we
be confident, given our characterization of the truth
conditions of the sentence "A passes the language test",
that we are attributing to A a rational mind in the sense
that Descartes is using the term in the quotations in
section 2.1? I think not.

Our language test does not show that A has a
rational mind, i.e. that the essence of A is thinking, in

Descartes' terms! What our language test really shows is much weaker; it shows that if A passes the language test, then A has a property which makes it capable of linguistic behavior much like ours as human beings. We should not be disappointed about that, however, since this is already a very important result, especially, since (E) and (B) are very formal and precise discovery procedures, even if they do not show exactly what Descartes would have wanted them to show, in case he had held them. We will use them as a basis for our further discussion.

Let us recapitulate our results so far. We have attributed the belief in propositions (A) and (B) to Descartes. Descartes himself has not specified very clearly the truth conditions for the antecedent of (B). Therefore, we set out to find these truth conditions. We have formulated these truth conditions very precisely in (E). But once the truth conditions for the antecedent of (B) were formulated clearly we saw that something has to be wrong with (A). For, logically it is possible that one can find an organism which does satisfy the language test but does not display any other defining properties of "rational mind", i.e. a mutation of man, call it "homo loquens", which speaks exactly like we do, but is principally incapable of our modes of imagination, whose minds are incapable of logical reasoning and of other

performances which we call intelligent, i.e. the use of
arithmetic, causality etc. I am sure that neither
Descartes nor we would be willing to attribute a rational
mind to members of this species. We thus have to give up
Descartes proposition (A)! But by no means do we have to
concede that our whole enterprise has failed. To the
contrary, having established very precisely under which
conditions an object passes the language test, we can can
use this result for the following purpose: let "property
U" stand for the mental property of man which allow every
member of this species to pass the language test. We can
then modify Descartes' (A) appropriately to (A*):

(A*) for all X (X can pass the language test iff X has
     property U)

From this we can deduce (B*):

(B*) for all X (if X can pass the language test, then X
     has property U)

B* is still a discovery procedure, but this time
it discovers property U, rather than rational minds. This
is still a highly significant result, we believe, for
satisfaction of B* can be taken as a necessary condition

for satisfying the discovery procedure for rational minds.
The discovery procedure for rational minds will in fact
not be a conditional sentence with an atomic sentence as
its antecedent at all, rather it will be a conditional
sentence with a conjunction of many different sentences as
the antecedent. In other words, our conception of rational
mind differs radically from Descartes in this respect: we
diverge from Descartes' conception of "rational mind" by
denying that the mind is a universal instrument of reason.
Rather, we believe that a rational mind is a combination
of many different capabilities, one of them being property
U. Other capabilities would be: the property of giving a
certain interpretation to visual perceptions, the property
of having free will and so forth.[8]

We are convinced that only those objects which have all
the properties just named and many more collectively will
pass the discovery procedure for rational minds. Passing
only one of these discovery procedures for the individual
properties, whichever one it is, or passing just a proper
subset of the relevant tests, will not suffice to pass the
discovery test for rational minds. Our final version of
this discovery procedure for rational minds is G:

(G) for all X (if X passes the tests $T_1, 2 \cdots$

Tn, then X has a rational mind)

In this chapter we have specified only one of the tests mentioned in the antecedent of (G), namely the language test. We are incapable of providing careful specifications of the other tests, since we do not even know which other capacities besides the language capacity U should be definitive of a rational mind. We believe that the capability of vision is one such property of rational minds, and one could specify conditions for satisfying a vision test on the basis of the work of David Hubel and Torsten Wiesel, cf. Hubel and Wiesel (1962, 1978). Furthermore, one will certainly want to require that an object with a rational mind is capable of logical inferences of some sort. One other component of a rational mind would thus have to be some logic or other. These are only random examples of properties which an object should have to deserve the attribution of a rational mind, a complete list is in principle possible, but presumably out of the range of contemporary work in Cognitive Science. But I believe that this is the only way of completing of what one might call "the Cartesian program", the program of determining the properties of a rational mind. It is unlikely that one will be able to determine on the basis of one single capacity whether an organism has a rational

mind or not. This is of course an empirical question which
cannot be answered on logical grounds alone and will need
further progress in all branches of the Cognitive
Sciences. In the final section of this chapter we will
give further arguments against Descartes' principle (A)
and in favor of our revised version of it.

2.4 Towards a definition of human nature

In section 2.3 we have argued that we should not
pursue the Cartesian methodology of search for rational
minds as we have formulated it in (A).[9]

Rather, we should analyze a rational mind as a mind which
has a whole array of capacities. One such capacity is
language for which we had defined a discovery procedure in
(B*). This is why we believe the formulation of (B*) to be
of more interest than the formulation of (A): once we have
found an object that satisfies (A) positively, we have an
object with a rational mind. But what does that mean? What
does it mean to have a rational mind? For Descartes the
extension of the property "being such that it has a
rational mind" was clear from the start: only humans were
supposed to have rational and immortal souls. Flies and

ants were not to be equated with man, they were not supposed to share the fears and hopes of what would happen to them after life. All animals apart from man are just machines according to Descartes and their behavior can be described in purely mechanistic terms.

This is unsatisfactory. Presumably, Chomsky (1980) expresses a common conviction of both the author of this thesis and all of its readers when he writes: "Nobody believes that bodies are Cartesian automata...". It is therefore far from clear whether the notion "rational mind" refers to anything at all apart from some arbitrarily chosen set of properties, in fact the properties tested by T_1 .. T_n in (G) above. Who shall decide whether it takes a passing of the language test to qualify for a rational mind? What if we trade the language capacity for a more sophisticated visual system? Are we giving up the notion "rational mind"? If yes, why? Furthermore, does the capacity to acquire chess belong to the necessary conditions for having a rational mind? If yes, why? If not, why not? Even when one restricts attention to the capacity of logical reasoning, one does not get clear results. Which of the infinitely many logics does one require? Will the propositional calculus do, or shall one require a quantificational logic? Once this decision is made, one can ask further: do we need a modal

logic? Can a being be rational, if it cannot handle logical relations of time? etc.

It should be clear from this discussion that the question "Which organisms have rational minds?" is meaningless as long as the term "rational mind" has not been defined. But even after the term has been defined, the question is not necessarily very interesting, for the definition is of course a nominal one and therefore arbitrary. In other words, if somebody wants to exclude all animals other than man from the class of organisms with a rational mind, then s/he can give a nominal definition of "rational mind" which will only allow humans and if s/he wants to prove that the soda machine next to his/her office has a rational mind, then s/he can also find a definition which will do the job.

We will thus not pursue the question of rational mindhood any further, since we consider it of little interest. For us, the question what the real capacities of humans and other animals are is much more interesting, that is we want to know as precisely as possible what the discrete components are that define human nature and we want to know what other animals can do and what they cannot do. Thus, the question which of the many tests of (G) each organism can pass is the relevant question for

us. Whether one takes the first fifteen of the capacities
checked by these tests as constitutive of the concept
"rational mind" or whether it takes thirty capacities or
maybe all, we do not find interesting, this is a purely
terminological matter and as irrelevant as the question
whether the government in some country should be called
fascist or conservative: the living conditions of the
people in this country are what counts and not the name we
give to the government. We might even choose to change the
name, but that does not mean that the living conditions of
the people change efficiently.

Let us now come back to proposition (B*). The
reason why we find (B*) very important is that it gives us
relevant information about human nature. (B*) is a
scientific hypothesis about part of the essence of man,
whether we choose to call man rational or not. If (B*) is
correct, then it contributes substantially to humanistic
study. In this sense (B*) is similar to (A) which also
tried to find a defining property of humanity. But there
is one important difference between the Cartesian (A) and
our Chomskyan (B*), a difference which Piatelli-Palmarini
(1980, 14) characterizes as follows:

> Chomsky's linguistic program, in contrast to the
> classical rationalist program in philosophy, is
> a scientific research program and thus committed
> to painstaking work on relevant data that can

provide tests for the conjectures embedded in
the protective belt.

We believe that (B*) is still Cartesian in spirit. We
agree with Descartes that the human language faculty is
unique in the biological world. With Premack we believe
that chimpanzees show significant signs of intelligence
and a certain amount of communicative competence. But
there are no animals which show anything like the
sophisticated language competence of human children let
alone the drive for verbal communiction or most
importantly the drive to use language as an expression of
thought. With the psychologist Jacques Mehler the
uniqueness of the second-order capacity of acquiring a
natural language (the language acquisition device (LAD))
can thus be taken as a constitutive element of human
nature:

> In effect, the LAD would be the nucleus from
> which language could become the characteristic
> instrument of mankind. (Piatelli-Palmarini 1980,
> 345)

(B*) is in the tradition of Descartes' (A) because
it, like (A), is a tool of the Cartesian quest for the
identity of man as a being with certain (mental)
capacities which distinguish him from other organisms. It
still clings to the Cartesian conception of mind as the

thinking substance, where thinking is taken in a very
broad sense. The Cartesian revolution based on the method
of systematic doubt inquired into the essence of human
nature ("But I do not yet know clearly enough what I am,
I who am certain that I am" Meditation II) and the
relationship between the mind and the world around it. In
this Descartes is "virtually a contemporary figure"
(Gardner 1985, 50). That he remains a contemporary figure
is to a certain extent due to another revolution, the
Chomskyan revolution in linguistics with repercussions in
the philosophy of mind and the philosophy of science. It
can hardly be an accident that the revivor of "Cartesian
linguistics" names the relationship between human nature
and the outside world as his main concern in the answer to
an interview question:

> As a linguist, I'm interested in discovering the
> nature of human language and, more generally,
> the nature of the human capacity for thought and
> self-expression. As a person, I would like to
> see a world fit for human beings... (quoted in
> Otero (1981)

Cartesian Linguistics will be the main concern of
our last chapter.

1. One can even go further than Descartes in the passage quoted in claiming that humans can acquire language despite other intellectual deficiencies, cf. the following remark by Chomsky:

> What has been found over and over again is that there seems to be a remarkable lack of correlation between the development of basic structural features of language and even very severe impairments of other kinds of intellectual ability. (in Piattelli-Palmarini (1980,175)

2. Animals which are incapable of imitating man's articulatory behavior are thus taught sign languages or other modes of production in our days. We will come back to this.

3. The discussion in this subsection is based to a large extent on the very stimulating discussion of animal communication systems in Aitchison (1976).

4. For more information on the linguistic capabilities of the two apes and more background information, cf. Gardner/Gardner (1969) on Washoe and Premack (1970, 1971, 1972) and Premack's paper in Piattelli-Palmarini (1980).

5. For our purposes it is of extreme importance that Premack, the psychologist who taught Sarah, joined a group of other researchers to teach a sign system very much like the one that Sarah acquired to people with severe global aphasia (people with a lesion in the language centers of the brain with consequent total inability to acquire normal language), cf. Glass/Gazzaniga/Premack (1975). We will use this fact later as evidence in support of two arguments: (a) Although chimpanzees are "very smart and [have] all kinds of sensorimotor constructions (causality, representational functions, semiotic functions ...)" (Chomsky), there is still a qualitative difference between their ability to acquire language and normally functioning humans; (b) Descartes' equivalence of language use and mindhood of the language user is untenable. If a person displays all the capacities which Descartes covers under "thinking" while being unable to achieve the requirements for normal language use, then passing the language test cannot be a sufficient condition for having a rational mind, as (B) claims. This very fact will ultimatly lead us

to question the concept of a unified rational mind as a whole.

6. "What's in a name? That which we call rose by any other nname would smell as sweet." (Shakespeare, Romeo and Juliet, act 2)

7. We find ourselves in agreement with David Premack here, who is also sceptical about the linguistic capabilities of bees:

> While holding this relaxed view of language, however, it is still questionable to consider bee commuunnication as language. (in Piattelli-Palmarini 1980, 212)

and

> While we wait for the critical experiments to demonstrate such an ability in the bee, we must adopt an agnostic position with regard to the language ability of bees; we must take the position that the bee has a code, a correlation between items inside and outside its body, not necessarily a language ... (op cit)

8. With thus picture of the mind we follow Fodor (1983) who develops a modular conception of the mind.

9. We are slightly unfair to Descartes here, since Descartes had in fact proposed at least two different tests for the determination of an object with a rational mind. It is unclear, however, whether Descartes considered each of the tests to be necessary and sufficient conditions for rational minds, or whether each is necessary but only both together are sufficient. Even if Descartes should have held the latter, we believe that this test would be far from conclusive. Again, one can easily imagine organisms which satisfy both conditions but which we would still be reluctant to attribute a rational mind to. There is no reason to believe that any one capacity of a rational mind will be a sufficient condition for rationality, and Descartes does not produce an argument that this should be so.

It has been argued that there exists something like "general intelligence", cf. for example Hilary Putnam's contribution to Piatelli-Palmarini (1980, chs. 14, 17). But Putnam's use of "general intelligence", whose conception might come closer to the Cartesian view of the mind as a universal instrument of reason than ours, is so

vague that the notion "general intelligence" is almost meaningless.

C H A P T E R   III

The Study of Language

In this chapter we will deal with the study of
language, and especially the study of language from the
perspective of what Chomsky has termed "Cartesian
Linguistics". The first part of the chapter is devoted to
an outline of the construct "Cartesian Linguistics" and
the rest of the chapter will concentrate on the philosophy
of language of the philosopher and linguist Wilhelm von
Humboldt. There has been a debate in the literature over
whether v. Humboldt should be viewed as a Cartesian
Linguist as defined in the first part of the chapter. We
will engage in this debate and try to find textual
evidence in favor of and against the positions taken in
this debate.

3.1 Cartesian Linguistics

Cartesian Linguistics is a theoretical construct!
There has never been a coherent school of researchers
which would have termed themselves Cartesian Linguists.
This chapter is thus not about a well-defined group of

people, neither chronologically nor locally. Cartesian
Linguistics as it will be described below is not dependent
on a certain age or geographical area. In fact, we might
well argue that there have lived Cartesian linguists long
before Descartes revolutionized philosophy in the
seventeenth century; in particular the Indian grammatical
tradition with the marvellous work on Sanskrit by Panini
and others more than 2 000 years ago is partly Cartesian,
as understood by us. Moreover, it is not clear that all
those aspects that we take to be definitional for
Cartesian linguistics would have been held by Descartes
himself. Surely, Descartes would not have agreed with the
position of Cartesian Linguistics that most of the
operations of our mind are not open to conscious
introspection. Here, for example, Cartesian linguistics
clearly and knowingly departs from the philosophical set
of doctrines held by Descartes.

Since "Cartesian Linguistics" is a technical term
with a very specific meaning, very much like the terms
"function" in set theory or "world" in formal semantics,
we will cling closely to the conception of Cartesian
linguistics that was put forth in Chomsky (1966), where
Chomsky enumerates certain intellectual positions which
are essential to Cartesian Linguistics. One could say that
the conjunction of all those positions forms the nominal

definition of Cartesian Linguistics.[1]

From this conception of Cartesian Linguistics it
already follows that it is a matter of degree rather than
absolute decision who counts as a Cartesian Linguist.
Since the defined term is a cover term for a family of
convictions, there is in principle no reason not to expect
that certain people will adhere to most, maybe all of
these positions, whereas others will pick out this one or
that one. Again, it is an empty enterprise to doubt that
someone is not a Cartesian Linguist because he adhered
only to 80 percent of the positions defining the
construct. This is very much like the quarrel over whether
a glass is half full or half empty. In our case study in
the second part of this chapter we will thus be interested
in whether v. Humboldt held several or many of the
positions which we take to be essential to Cartesian
Linguistics. If it turns out that he does, but only to a
certain degree, then the reader may decide for him/herself
whether s/he wants to refer to v. Humboldt as a Cartesian
linguist or not.

We thus have a very specific goal in this chapter.
We are not trying to write an authoritative history of
linguistics and the philosophy of language, nor are we
trying to pick out one era to give an authentic account of

the (philosophical) study of language in this era. Rather we start in the twentieth century with certain aspects of the study of language that we are interested in. Then we go back in time to find ancestors in the sense of persons who have held these positions. Chomsky makes this point very clear in his book:[2]

> My primary aim is simply to bring to the attention of those involved in the study of generative grammar and its implications some of the little-known work which has bearing on their concerns and problems and which often anticipates some of their specific conclusions. (Chomsky 1966, 2)

Let it be understood then, that neither we nor Chomsky are attempting a historical account of the study of language. Nor are we interested in categorizing figures as one hundred percent Cartesian Linguists or not. We take as a starting point a number of intellectual positions held by present day Generative Grammar and trace them back in time, in this thesis to the first half of the nineteenth century, the days of Wilhelm v. Humboldt.

Chomsky (1966) takes four main aspects to be essential of Cartesian Linguistics: (a) Creative aspect of language use; (b) Deep and surface structure; (c) Description and explanation in linguistics and (d) Acquisition and use of language. The second point is self-explanatory for everyone familiar with the work of

Generative Grammar during the last 30 years, so we will
not discuss it here.

We have seen in chapters 1 and 2 that Descartes
considered a mechanistic explanation for the linguistic
behavior of man impossible, since man knows how to react
appropriately linguistically in an indefinite amount of
situations. This sets man apart both from all other
animals and from machines:

> we should always have two very certain tests by
> which to recognise that, for all that, they were
> not real men. The first is, that they could
> never use speech or other signs as we do when
> placing our thoughts on record for the benefit
> of others. For we can easily understand a
> machine's being constituted so that it can utter
> words, and even emit some responses to action on
> it of a corporeal kind, which brings about a
> change in its organs; for instance, if it is
> touched in a particular part it may ask what we
> wish to say to it; if in another part it may
> exclaim that it is being hurt, and so on. But it
> never happens that it arranges its speech in
> various ways, in order to reply appropriately to
> everything that may be said in its presence, as
> even the lowest type of man can do. (116)

According to this paragraph, language functions as
a means for the expression of man's thought. Furthermore,
there is no upper bound to this expression of thought. We
saw in chapter 1 that Descartes believed that human
knowledge is severely constrained, e.g. a finite mind like
ours is in principle incapable of grasping infinite God in
his entirety. Attributing to man a finite mind with finite

knowledge capable of reacting correctly in a linguistic manner in an indefinite amount of situations means to attribute to man the faculty to make infinite use of finite means. Chomsky refers to this unbounded and stimulus-free faculty of man as the "creative aspect of ordinary language use". This is thus the first defining part of "Cartesian Linguistics".

The third defining aspect of Cartesian Linguistics is "Description and Explanation in Linguistics". Concerning the first part of this aspect we do not find much in Descartes' work, since he paid little or no attention to the analysis of natural language in his philosophical and scientific work. The second part did interest him, however, for this question is part of the language test problem discussed in the previous chapter. Wilson (1978) sums up our result of the previous chapter:

> Descartes is maintaining that an immaterial soul must be invoked to "explain" human language use, because a strictly mechanistic account is inconceivable. (183)

We will come back to the question whether a mechanistic or behavioristic account of language acquisition is desirable when we discuss the fourth defining property of Cartesian lingustics. For the moment let us stick to the Cartesian conviction that the existence of natural language is a

phenomenon which needs an explanation in the first place.
Descartes postulated the non-material soul to account for
the fact that there is a species-specific uniform faculty
for using speech in a creative manner. Descartes himself
did not push the question what this uniform faculty that
allows man to acquire and use natural language might
consist of. This was only done later when the idea of
Universal or Philosophical Grammar emerged, the idea that
all grammars of natural languages have certain aspects in
common and that all members of the human species are
equipped with this knowledge.

The last point that we will discuss is in fact
related to the previous one: aquisition and use of
language. Again, Descartes did not fill out the frame of
the discussion that he set off with his language test
argument. But in the first chapter we have discussed
Descartes' theory of knowledge which is very close to
Plato's theory in "Meno" and "Phaidon", i.e. the claim is
made that learning is recollection of what the soul had
already contained in it. Descartes postulated the
existence of innate ideas in the soul, ideas which are not
very concrete but rather represent a faculty of the mind
to analyze data from the external world in a predetermined
fashion. This idea was later developed in the Cartesian
tradition and applied to knowledge of language. We will

thus take the following formulation of it to be
constitutive of Cartesian Linguistics: learning a language
is not a mechanistic enterprise. Rather, the human mind is
equipped with a second-order faculty which enables it to
analyze lingustic data received by the senses in certain
ways which allow it to structure the received information
and to develop the first-order capability of producing and
understanding an infinite amount of grammatical structures
of his natural language. We call the set of innate
analytical principles "Universal Grammar" and the
first-order capability developed out of the interaction of
Universal Grammar and the confrontation with primary
sensory experience "a grammar" of a specific language.
Cartesian Linguistics accounts for the uniform and
exclusive endowment of man with specific analytical
procedures for linguistic structures by postulating an
innate Universal Grammar and accounts for the creative use
of a specific language by men by postulating the knowledge
of a grammar of this specific language whose form is
constrained by the principles of Universal Grammar.

The conjunction of these four claims forms the
theoretical construct "Cartesian Linguistics". The rest of
this chapter will be devoted to the question whether the
Prussian philosopher, statesman and linguist Wilhelm v.
Humboldt held any of these views.

2.2 Cartesian Linguistics and Wilhelm von Humboldt

One of the more well-known discussions in the history of the philosophy of language has been aroused by Noam Chomsky's philosophical interpretation of his thoery of the human language faculty which has come to be known as "Generative Grammar". The foundations of Generative Grammar were laid in Chomsky's (1955) The Logical Structure of Linguistic Theory, a classical piece of linguistic literature since then. The theory then went through different stages into its current formulation in Chomsky (1986). In this paper I will presuppose a basic familiarity with the systems in Chomsky (1957, 1965, 1981).

At the beginning of the sixties Chomsky noticed certain paralellisms between the foundations of modern linguistic theory as embodied in Generative Grammar and assumptions made in several philosophical systems dealing with man and his language. Chomsky referred to the totality of these shared assumptions as "Cartesian linguistics", i.e. the idea was not that a homogeneous community of researchers or even a homogeneous tradition of researchers existed who would consider themselves members of a Cartesian school of language study. Rather, what Chomsky stressed was that many philosophical and

linguistic assumptions can be found time and again in the
study of language since the seventeenth century. This view
comes out quite clearly in the following quotation from
Chomsky (1966, 2):

> There is no single individual who can be shown,
> on textual grounds to have held all the views
> that will be sketched ... Furthermore, the
> aptness of the term "Catesian linguistics" for
> these developments in linguistic theory maay
> well be questioned, on several grounds. First,
> these developments have roots in earlier
> linguistic work; second, several of the most
> active contributors to them would surely have
> regarded themselves as quite antagonistic to
> Cartesian doctrine.

Chomsky's goal therefore is not to give an
accurate account of the history of the philosophy of
language since the seventeenth century, rather
,explicitly, the goal is to "concentrate on the
developments of ideas that have reemerged, quite
independently, in current work" (Chomsky (1966, 2)), i.e.
the modern version of Cartesian linguistics: Generative
Grammar.

One philosopher whose ideas Chomsky takes to be
sufficiently similar to the body of ideas he refers to as
Cartesian linguistics is Wilhelm von Humboldt, who is
often regarded as the founder of linguistics. Chomsky
noted similarities between his own philosophical and
linguistic assumptions and the ideas expressed by von

Humboldt in his work. The similarities and differences between these two distinguished linguists and philosophical thinkers about language shall be the topic of this section.

Some time after Chomsky's interpretation of Cartesian linguistics had appeared, several critics appeared on the scene, claiming that Chomsky had misinterpreted von Humboldt's writings and that what Chomsky took to be similarities in spirit between von Humboldt's concepts and his own concepts were similarities in terminology rather than in content. To give a few examples, Baumann (1971, 2) comes to the following conclusion:

> Es ist meine Absicht zu zeigen, dass Chomsky ...
> die Auffassungen Humboldt's nicht angemessen
> wiedergibt und dass Humboldt's 'Theorie' eine
> andere ist als diejenige, auf die sich die
> generative Grammatik zu beziehen glaubt, wenn
> sie sich auf Humboldt bezieht.

Or Coseriu (quoted by Baumann from a paper which was not accessible to the author) believes:

> Somit ist der Humboldt, von dem heute in der
> transformationalistischen Literatur so oft die
> Rede ist, nicht der historische Wilhelm von
> Humboldt, sondern hoechstens ein hybrider "Noam
> von Humboldt".

Weydt (1976, 57), another one of Chomsky's critics notes

the following about Chomsky's and von Humboldt's use of the concept of "infinite use of finite means":

> Nur das ist festzustellen, dass hier keine
> Uebereinstimmung zwischen beiden Autoren
> herrscht.

Other such evaluations of the similarities between Chomsky's and von Humboldt's systems of thought will be given and discussed shortly, but at this point I will introduce the two aspects of the debate that I will concentrate on: "infinite use of finite means" and v. Humboldt's term "erzeugen" vs. Chomsky's term "to generate". I will present Weydt's argument that leads him to the conclusion just quoted and also the arguments given by several authors that v. Humboldt's "erzeugen" does not have anything to do with Chomsky's "to generate".

The goals of this chapter are twofold: first I want to make a purely methodological point, namely that Chomsky's position cannot be refuted the way the authors cited try to. I will try to show that all the authors attacking Chomsky for misinterpreting v. Humboldt have committed a methodological fallacy which makes Chomsky's position immune to their criticism. Second, I want to show that because the arguments given by Weydt, Baumann and others against Chomsky's position beg the question, Chomsky's position is the correct one, i.e. I will defend

this position on the basis of textual evidence. If the textual evidence that I give is correct, then Chomsky is open only to one kind of criticism, namely that he did not make use of the clearest quotations that can be found for his position in v. Humboldt's writings, certainly a minor point.

To give a similar example from semantics: one cannot refute the claim that the English word "bank" has the sense "an establishment for the custody, loan, exchange, or issue of money, for the extension of credit, and for facilitating the transmission of funds" by providing evidence of whichever kind that the word is used with the sense "the rising ground bordering a lake, river, or sea or forming the edge of a cut or hollow" (Webster) by native speakers of English. To disprove the claim that the word can be used with the first sense, one would have to show that native speakers do in fact <u>not</u> use the word in this sense; proving other irrelevant properties of the usage of the word is beside the point.

The overall goal of this paper, as mentioned above, is thus to give arguments and textual evidence for "the ambiguity hypothesis", which attributes to v. Humboldt an ambiguous and sometimes vague usage of terms. We are by no means alone in this interpretation of v. Humboldt's

writings. Amirova et al. (1980) note explicitly:

> Dagegen stellen die objektiv nicht ganz klare
> Problemstellung und die nicht eindeutige und oft
> schwer interpretierbare Verwendung von
> Grundbegriffen, wie "Geist", "Denken",
> "Verstand", "intellektuelle Taetigkeit" die
> schwache Seite seiner Sprachphilosophie dar.
> Humboldt hat dies offenbar eingesehen. Durch
> zahlreiche Varianten seiner Formulierungen
> versucht er gewissermassen den Einwaenden
> zuvorzukommen und gleichzeitig zu zeigen, wie
> kompliziert die Erscheinungen der Sprache und
> des Denkens und deren Wechselwirkung sind und
> wie unsere Kenntnisse historisch begrenzt sind.

It will be enough to give two clear examples of ambiguous
notions in v. Humboldt's works on the philosophy of
language. One striking example is the usage of the word
"language" itself. Note the following passage:

> Es ist kein leeres Wortspiel, wenn man die
> Sprache als in Selbsttaetigkeit nur aus sich
> entspringen und goettlich frei, die Sprachen
> aber als gebunden und von den Nationen, welchen
> sie angehoeren, abhaengig darstellt. (v.
> Humboldt (1973, 37))

"Sprache" thus denotes a social phenomenon belonging to
nations of interacting and communicating people as well as
the private experience of each individual speaker which
makes him part of humanity. It becomes quite clear that v.
Humboldt attributes different properties to these
respective denotations of the word "language". The social
phenomenon language is dependent on a nation and a

culture, and as such is as "mannigfaltig" (diverse) as
human culture. This is not true for language as a common
human experience, which is uniform. This interpretation of
ours is shared by Howard Isharm in his Encyclopedia of
Philosophy article on v. Humboldt:

> The formation of languages depends on the
> spiritual forces of humanity, and languages are
> thus not merely an intermediary between
> individuals but "the most radiant sign and
> certain proof that man does not possess
> intrinsically separate individuality." Languages
> delineate the cultural characteristics of
> nations, each of which has its own individuality
> and arouses a sense of unity in men.

The following passages from v. Humboldt also shows that he
links the variability of languages to the variability of
cultures:

> dass der Bau der Sprachen im Menschengeschlecht
> darum und insofern verschieden ist, weil und als
> es die Geisteseigentuemlichkeit der Nationen
> selbst ist.

> Das vergleichende Sprachstudium, die genaue
> Ergruendung der Mannigfaltigkeit, in welcher
> zahllose Voelker dieselbe in sie, als Menschen
> gelegte Aufgabe der Sprachbildung loesen,
> verliert alles hoehere Interesse, wenn sie sich
> nicht an den Punkt anschliesst, in welchem die
> Sprache mit der Gestaltung der nationalen
> Geisteskraft zusammenhaengt.

> Weit mehr aber, als bei den einzelnen Woertern
> zeichnet sich die intellektuelle Verschiedenheit
> der Nationen in den Fuegungen der Rede, in dem

Umfange, welchen sie den Saetzen zu geben
vermag, und in der innerhalb dieser Grenzen zu
erreichenden Mannigfaltigkeit. Hierin liegt das
wahre Bild des Ganges und der Verkettung der
Gedanken, an die sich die Rede nicht wahrhaft
anzuschliessen vermag, wenn nicht die Sprache
den gehoerigen Reichtum und die begeisternde
Freiheit der Fuegungen besitzt. (v. Humboldt
(1973, 163))

We get a completely different picture though, when we try

to find the passages where v. Humboldt characterizes "the

other language", i.e. the human faculty and experience

which is independent of nations and cultures. Here we

typically find passages where the philosopher attributes

uniformity to language:

Da die Naturanlage zur Sprache eine allgemeine
des Menschen ist und alle den Schluessel zum
Verstaendnis aller Sprachen in sich tragen
muessen, so folgt von selbst, dass die Form
aller Sprachen sich im wesentlichen gleich sein
und immer den allgemeinen Zweck erreichen muss.
(v. Humboldt (1973, 200))

Daechte man sich das vergleichende Sprachstudium
in einiger Vollendung, so muesste die
verschiedene Art, wie die Grammatik und ihre
Formen in den Sprachen genommen werden (denn
dies ist es, was ich unter Auffassung dem
Begriff nach verstehe), an den einzelnen
grammatischen Formen, wie hier am Dualis, dann
an den einzelnen Sprachen, in jeder im
Zusammenhange erforscht, und endluch diese
doppelte Arbeit dazu benutzt werden, einen
Abriss der menschlichen Sprache, als ein
Allgemeines gedacht, in ihrem Umfange, der
Notwendigkeit ihrer Gesetze und Annahmen, und
der Moeglichkeiten ihrer Zulassungen zu
entwerfen. (v. Humboldt (1973, 21))

Indem die Sprachen nun also in dem von allem
Missverstaendnis befreiten Sinne des Worts
Schoepfungen der Nationen sind, bleiben sie doch
Selbstschoepfungen der Individuen, indem sie
sich nur in jedem einzelnen, in ihm aber nur so
erzeigen koennen, dass jeder dsa Verstaendnis
aller voraussetzt und alle dieser Erwartung
genuegen. (v. Humboldt (1973, 37))

Die Formen mehrerer Sprachen koennen in einer
noch allgemeineren Form zusammenkommen, und die
Formen aller tun dies in der Tat, insofern man
ueberall bloss von dem Allgemeinsten ausgeht:
von den Verhaeltnissen und Beziehungen der zur
Bezeichnung der Begriffe und zur Redefuegung
notwendigen Vorstellungen, von der Gleichheit
der Lautorgane, deren Umfang und Natur nur eine
bestimmte Anzahl artikulierter Laute zulaesst.
(v. Humboldt (1973, 43))

Denn so wundervoll ist in der Sprache die
Individualisierung innerhalb der allgemeinen
Uebereinstimmung, dass man ebenso richtig sagen
kann, dass das ganze Menschengeschlecht nur
eine Sprache, als dass jeder Mensch eine
besondere besitzt. (v. Humboldt (1973, 43))

 ... erklaert sich jene Erscheinung hinlaenglich
daraus, dass der Mensch ueberall eins mit dem
Menschen ist, und die Entwicklung des
Sprachvermoegens daher mit Huelfe jedes
gegebenen Individuums vor sich gehen kann. Sie
geschieht darum nicht minder aus dem eignen
Inneren; nur weil sie immer zugleich der
aeusseren Anregung bedarf, muss sie sich
derjenigen analog erweisen, die sie gerade
erfaehrt, und kann es bei der Uebereinstimmung
aller menschlichen Sprachen. (v. Humboldt (1973,
52))

Denn jede Sprache bleibt immer ein Abbild jener
urspruenglichen Anlage zur Sprache ueberhaupt
... (v. Humboldt (1973, 206))

    Whatever may be the reason for v. Humboldt's

decision to refer to these different concepts of

"language" by the same notion, it is quite clear that

"language" in his system stands for two radically different concepts. The reason certainly is not a lack of words or his attempt to reduce the number of technical terms introduced, for we find a profileration of different terms throughout his writings: "sprachliche Kraft", "das Sprechen", "sprachlicher Organismus", "Sprachvermoegen", "Form der Sprache", "sprachliche Gewalt", "Sprachbesitz", "Sprachgeist" and many others. It is not clear whether the ambiguity of "Sprache" extends to all the complex expressions it goes into; we leave an examination of this question to further research.

The textual evidence for the ambiguity of the notion "Sprache" with its different senses is extensive. We can thus try to determine whether v. Humboldt and Chomsky's usages of "Sprache" or "language" have something in common. Although Chomsky shares with v. Humboldt his interest in political reform and personal engagement in the proliferation of new and liberal ideas in their respective societies, his scientific work does not show any signs of occupation with "language" as a social phenomenon. Although he, like all generative grammarians, would stress the necessity of a theory of language use, he himself has not developed such a theory or advocated one such theory rather than others. Textual evidence for this latter claim is easy to find. Chomsky (1981b) starts out

as follows:

> The study of language is guided by a number of
> fundamental questions, among them the following:
> (1)a: What constitutes knowledge of a language?
>   b: How does such knowledge develop?
>   c: How is such knowledge put to use?

The other concept of "language" - the concept of

an experience shared by all humans and only by humans - is

found through all of Chomsky's scientific work, in fact

one might say that Chomsky's empirical and philosophical

work on language has been about this concept of language.

This comes out again quite clearly in the last quotation

given, where the first two points raise the question of

the interrelation of each individual human being and the

knowledge of language he personally has and how he has

come to have this knowledge. We can thus only compare

Chomsky's and v. Humboldt's claims about human language,

when we take into account that v. Humboldt describes two

different phenomena with incompatible properties. For the

determination of similarities and dissimilarities of his

views with Chomsky we may therefore only take into account

the non-social aspect of language, which - for

terminological clarity - I will refer to as I-language

from now on (short for "individual language").

Once one has separated the two notions of language

in v. Humboldt's writings, the Cartesian aspect of his
philosophy of I-language comes out very strongly, as is
witnessed by the series of quotations about I-language we
gave above. Chomsky defines the Cartesian view on
I-language as follows (Chomsky (1966,59)):

> The central doctrine of Cartesian linguistics is
> that the general features of grammatical
> structure are common to all languages and
> reflect certain fundamental properties of the
> mind.

Compare this to the following passage from v. Humboldt
which we have already seen but which is repeated here for
convenience:

> Da die Naturanlage zur Sprache eine allgemeine
> des Menschen ist und alle den Schluessel zum
> Verstaendnis aller Sprachen in sich tragen
> muessen, so folgt von selbst, dass die Form
> aller Sprachen sich im wesentlichen gleich sein
> und immer den allgemeinen Zweck erreichen muss.

Although it is true that elsewhere v. Humboldt
claims that humans are predisposed for the language of
their own people, the quotation we just gave shows that
that did not keep him from supporting the general
Cartesian view (in Chomsky's sense) that language is
universal, i.e. that all humans are predisposed for all
human languages, even if one language might be favored.
Note that Chomsky in the passage given does not claim that

all natural languages have certain structures in common, again Chomsky is more careful. He makes the weaker claim, that general features of grammatical structure are common to all languages. But exactly this claim about I-language we also find in v. Humboldt, for "Form" in the following paragraph certainly refers to grammatical features rather than to "Form der Sprache" or "innere Form":

> Daechte man sich das vergleichende Sprachstudium in einiger Vollendung, so muesste die verschiedene Art, wie die Grammatik und ihre Formen in den Sprachen genommen werden (denn dies ist es, was ich unter Auffassung dem Begriff nach verstehe), an den einzelnen grammatischen Formen, wie hier am Dualis, dann an den einzelnen Sprachen, in jeder im Zusammenhange erforscht, und endlich diese doppelte Arbeit dazu benutzt werden, einen Abriss der menschlichen Sprache, als ein Allgemeines gedacht, in ihrem Umfange, der Notwendigkeit ihrer Gesetze und Annahmen, und der Moeglichkeiten ihrer Zulassungen zu entwerfen. (v. Humboldt (1973, 21) emphasis added)

This result will pave the way for our discussion of other elements of Chomsky's interpretation of v. Humboldt's philosophy of language, for example the aspect of his interpretation criticized by Leppin (1977). Leppin deals with v. Humboldt's term "erzeugen" and Chomsky's use of the notion "to generate". The article reaches the

following conclusion:

> However, in my opinion this translation, though
> technically correct, is based upon two different
> definitions of the term. It follows from
> Chomsky's own definitions of 'generative
> grammar' that he means 'generate' or 'erzeugen'
> in the mathematical sense. For von Humboldt, on
> the other hand, the term 'erzeugen' has only
> slight connection with what remains stable in a
> language, its structure, its form (which he had
> recognized as the channels in which the spritual
> energy of the members of a nation moves when
> creating language), but much more with this
> spiritual energy itself.

The methodological fallacy committed by Leppin is

that she does not take into the account the possibility

that v. Humboldt's notion "erzeugen" might be ambiguous

between the two interpretations. This is what Chomsky

obviously claims, for otherwise the following quote would

be puzzling:

> Furthermore, "generate" seems to be the most
> appropriate translation for Humboldt's term
> "erzeugen", which he _frequently_ uses, it
> seems, in essentially the sense here intended.
> (Chomsky (1965,9), emphasis added)

As is quite clear from Chomsky's careful formulation, he

is not trying to imply that Humboldt's term "erzeugen" is

coextensive with the technical usage of "to generate" in

the algebraic sense of combinatorial systems. But this is

what all of Chomsky's critics falsely assume. Thus by

showing that v. Humboldt's terms, especially the term
"erzeugen" have a sense which is incompatible with the
sense of "to generate" in the algebraic sense, and by
providing textual evidence that v. Humboldt did use the
notion in this incompatible sense, Chomsky's position is
unaffected. Baumann (1971) - who admits that "Humboldt ist
in diesem Punkt alles andere als klar" - believes that

> Bei Humboldt besteht das "Wesen der Sprache" in
> ihrer Geschichtlichkeit, "Erzeugung" hat bei ihm
> kein mathematisches, dafuer ein starkes
> diachronisches Implikat - das bei Chomsky gerade
> fehlt.

Now, Baumann like Leppin doesn't get beyond this
claim, especially no textual evidence is given that
"Erzeugung", "erzeugen" and similar terms can only be
interpreted diachronically. To show this for some
occurrences of the notions is not enough, since Chomsky
had not questioned that the notion is used in this sense.
To refute Chomsky's interpretation more would have been
necessary, namely the listing of all the passages where v.
Humboldt uses the term "erzeugen" with evidence that only
one interpretation of this notion is possible, but not the
one that Chomsky is advocating for some of the
occurrences. Although none of the authors have achieved
such a goal and no further action on Chomsky's side would
be called for until some such thing has been shown, I want

to quote certain passages from v. Humboldt's writings
which seem to favor only the Chomskyian interpretation of
the notions "erzeugen", "Erzeugung" and their synonyms or
are at least compatible with such an interpretation. Note
for example the following passage from v. Humboldt (1973):

> Wie ich es hier in diesem einzelnen Falle getan
> habe, kann man diesen Akt ueberhaupt den Akt des
> selbsttaetigen Setzens durch Zusammenfassung
> (Synthesis) nennen. Er kehrt ueberall in die
> Sprache zurueck. Am deutlichsten und
> offenbarsten erkennt man ihn in der Satzbildung,
> dann in den durch Flexion oder Affixe
> abgeleiteten Woertern, endlich ueberhaupt in
> allen Verknuepfungen des Begriffs mit dem Laute.
> In jedem dieser Faelle wird durch Verbindung
> etwas Neues geschaffen. (v. Humboldt (1973,
> 168) emphasis added)

This passage clearly talks about the formation of forms:
sentences and words. It stresses the creative aspect of
language, in that the produced new sentences and words -
the "Verbindung" represents something new. This fits well
with the following remark where the production of forms by
the speaker in a conversation is high-lighted:

> So lange die Bezeichnungen der grammatischen
> Verhaeltnisse, als aus einzelnen, mehr oder
> weniger trennbaren Elementen bestehend angesehen
> werden, kann man sagen, dass der Redende mehr
> die Formen in jedem Augenblick selbst
> bildet, als sich der vorhandnen bedient. (v.
> Humboldt (1985, 62) emphasis added)

This latter paragraph fits nicely into the Cartesian view of the human mind and its creativity together with the following statements:

> Obgleich der Erkenntnisgrund der Wahrheit, des unbedingt Festen, fuer den Menschen nur in seinem Inneren liegen kann ... (v. Humboldt (1973, 49))

> Auf diese Weise liegt die Sprache in jedem Menschen in ihrem ganzen Umfange, was aber nichts anderes bedeutet, als dass jeder ein, durch eine bestimmte modifizierte Kraft, anstossend und beschraenkend, geregeltes Streben besitzt, die ganze Sprache, wie es aeussere oder innere Veranlassung herbeifuehrt, nach und nach aus sich hervorzubringen und hervorgebracht zu verstehen. (v. Humboldt (1973, 49))

A very clear example of v. Humboldt's view that the mind does not only generate thoughts and facts, but also has rules to create forms of the language can be given with the following textual evidence. What is interesting about this quotation is that v. Humboldt even mentions both the generation of words and the generation of concepts:

> Denn es ist durch sie [die Artikulation; G.W.], auch in einzelnen Woertern, die Moeglichkeit gegeben, aus den Elementen dieser eine wirklich bis ins Unbestimmte gehende Anzahl anderer Woerter nach bestimmten Gefuehlen und Regeln zu bilden und dadurch unter allen Woertern eine Verwandtschaft, entsprechend der Verwandtschaft der Begriffe, zu stiften. (v. Humboldt (1973, 50))

Thus v. Humboldt seems to have envisaged a parallelism in the generation of concepts and of words. That he only talks about words and not also about sentences should not disturb us very much, since he apologizes elsewhere "ihr [der Sprache; G.W.] Element, das Wort, bei dem wir der Vereinfachung wegen stehenbleiben koennen (v. Humboldt (1973, 138)). Such a parallelism in the generation of concepts and words in v. Humboldt's philosophy of language can of course not come as a surprise, given that he held a particularly strong form of the thesis that language and thinking are interconnected. In fact he says that

> Sie [die intellektuelle Taetigkeit; G.W.] und
> die Sprache ist daher eins und unzertrennlich
> voneinander.

and

> Die grammatische Formung entspringt aus den
> Gesetzen des Denkens durch Sprache ...

As a particularly beautiful example of this paralellism of the forming of forms and the forming of concepts, note that the thought is supposed to be composed of words. This statement is made in the same paragraph which starts out with a discussion of the formation of sentences. v. Humboldt is thus not making a sharp distinction between sentences and thoughts, and this is in fact consequent, since he does not make a difference between language and

thinking processes. If language and thinking are identified, then it would be surprising if their respective primitive building blocks were not identical too:

> Es ist aber zugleich merkwuerdig zu sehen, auf welchem verschiedenem Wege die geistige Ansicht hier zur Satzbildung gelangt. Sie geht nicht von seiner Idee aus, setzt ihn nicht muehevoll zusammen, sondern gelangt zu ihm, ohne es noch zu ahnen, indem sie nur dem scharf und vollstaendig aufgenommenen Eindruck des Gegenstandes Gestaltung im Laute erteilt. Indem dies jedesmal richtig und nach demselben Gefuehle geschieht, ordnet sich der Gedanke aus den so gebildeten Woertern zusammen. In ihrem wahren, inneren Wesen ist die hier erwaehnte geistige Verrichtung ein unmittelbarer Ausfluss der Staerke und Reinheit des urspruenglichen im Menschen liegenden Sprachvermoegens. (v. Humboldt (1973, 125))

We can thus sum up our discussion of Leppin's and Baumann's criticism of Chomsky's interpretation of v. Humboldt's usage of the terms "erzeugen" and "Erzeugung" as follows: both authors have failed to notice that v. Humboldt uses the notions under discussion in different senses. Although it is true that many, maybe most of, the occurrences of the terms suggest a reading in terms of a diachronic renewal of language, this does not affect Chomsky's interpretation, since he had not disclaimed that. The notions can be found in passages where a diachronic reading does not seem to be intended or is at

least implausible, for example the passage referring to
the speaker producing forms in every instant. Here the
interpretation of rule-governed production of linguistic
forms by a speaker of a language is very natural and fits
into v. Humboldt's general conviction that language and
thought processes are identical, with the consequent
identification of their primitives. Since in many of the
paragraphs the creativity of the formation of thoughts and
linguistic forms is stressed along with the individual
mind as the carrier of such thoughts and producer of
language, this aspect of v. Humboldt's philosophy of
language truly deserves to be called Cartesian.

Let us now turn to another one of v. Humboldt's
concepts which is discussed by Chomsky. What is at issue
is closely related to creativity, namely v. Humboldt's use
of the phrase "to make infinite use of finite means". We
will discuss this problem in some detail. In modern
comparative linguistics dealing with the foundations of
the human language faculty, the phrase cited has a clear
application: it refers to the ability of each speaker of a
native language to produce linguistic structures, words,
phrases or sentences, which he has never heard before,
i.e. has not just taken from a store of linguistic
material in his memory. The claim is that a native human

speaker, subject to memory limitations, processing limitations and other "on-line restrictions" can still produce and understand an amount of linguistic structures which by far exceeds his memory capacities. Furthermore, modern linguistic research of course studies an idealized native speaker who is not subject to any of the restrictions just mentioned and who lives in an idealized homogeneous speech community - this idealization is necessary in order to separate the inherent properties of the language organ from properties of "on-line organs" like the memory etc. Since this idealized native speaker knows all rules of his language perfectly and is not subject to any errors etc. s/he can produce infinitely many grammatical structures, since s/he can process sentences of indefintie length etc. Still the rule system generating this infinite amount of structures has to be finite, since the language organ of the idealized speaker is taken to be finite, since it is not supposed to differ from the language organ of a normal native speaker.

Chomsky now claims that v. Humboldt has a parallel idea in mind when he stresses the fact that language "von endlichen Mittel einen unendlichen Gebrauch macht". Weydt (1976, 57) does not agree with Chomsky on this point:

> Humboldt hat zwar etwas "unendlich" genannt,
> aber eindeutig nicht die Zahl der Saetze in der
> Sprache, sondern die Menge des Denkbaren. Das
> heisst: der Gegenstand, ueber den man mit
> Sprache sprechen kann, ist unendlich. Fuer
> Humboldt besteht der unendliche Gebrauch der
> Sprache darin, dass es unendlich viele Gedanken
> oder denkbare Sachverhalte gibt, die man alle
> mit Sprache ausdruecken kann. Ueber die Zahl der
> Saetze hat er sich nicht geaeussert.

Before we examine the question whether this last

claim is correct, let us first trace Weydt's argument a

little bit further. Being a biographer of Chomsky's, Weydt

notes that Chomsky had mentioned the fact that languages

make infinite use of finite means already in his earliest

works. Searching the bibliographies and footnotes of these

works, Weydt discovers that v. Humboldt is not mentioned

in any of these early works. He thus concludes that

Chomsky's and v. Humboldt's discovery of this fact must be

independent from one another. However, the relevance of

this detective work is slightly diminished by the fact

that Chomsky had noted the independence of his discoveries

from v. Humboldt's years before Weydt's publication in

Cartesian Linguistics (page 2). Having established that

Chomsky could not have gotten this insight from v.

Humboldt, maybe he got it from somebody else, having

forgotten where he had taken it from when he was writing

his early books. One candidate whose name can be found in

the footnotes of Syntactic Structures is Louis

Hjelmslev. Hjelmslev in his <u>Prolegomena</u> <u>to</u> <u>a</u> <u>theory</u> <u>of</u>
<u>language</u> had in fact spoken of infinitely many texts of
each language. Since Chomsky marks similarities between
his assumptions and some of Hjelmslev's assumptions in
Chomsky (1957,50), maybe this is the real source of
Chomsky's knowledge. Weydt now goes on to show that the
number of sentences of natural languages is in fact not
infinite, i.e. that Chomsky's claim is in fact false. From
this together with the preceding discussion he arrives at
the overall conclusion:

> Chomsky's Definition der Sprache ist: System zur
> Erzeugung unendlich vieler Saetze. Das ist im
> streng theoretischen Sinne nicht akzeptabel.
> Annehmbar ist dagegen eine Definition im Sinne
> Hjelmslevs von der Sprache als System zur
> Generierung unendlich vieler Texte. Diese
> Definition koennte auch von den Autoren der
> ersten Gruppe [Buehler, v. Humboldt, Martinet;
> G.W.] akzeptiert werden, sogar in ihrem Sine
> sein: fuer unendlich viele, neue, vorher nicht
> kommunizierte Nachrichten schafft sich der
> Mensch die entsprechenden Texte. Dass man dazu
> unendlich lange, oder aber auch nur ueberlange
> Monstersaetze braucht, waere ihnen nicht
> eingefallen.

In this paragraph almost everything that could be false is
in fact false. In the very first sentence Weydt gets his
technical terms mixed up. Chomsky of course does not
define language as a system that produces sentences in the
works that Weydt quotes. A language can in fact not
produce anything, at least if understood in the sense of

I-language discussed above. Under this construal a
language is just a set-theoretic object, namely the set of
grammatical forms generated by some grammar. The same is
of course true for Hjelmslev. It is meaningless to say
that a language is a system for the generation of
infinitely many texts. For Hjelmslev, language was a
system of infinitely many texts, not a system for the
generation of texts.

The next claim of Weydt's is not beyond doubt
either, namely that Chomsky was the only one among the
mentioned researchers who claimed that languages contained
infinitely many sentences. According to Weydt Chomsky
contrasts with all the others and since the claim that
human languages contain infinitely many sentences is false
(according to Weydt) Chomsky is the bad guy as compared to
the others. Note that Hjelmslev has an articulate
discussion of infinity in his book. He says the following
(p. 47):

> Es werden also im Lauf einer fortgesetzten und
> durchgefuehrten Analyse zwei Grenzen
> ueberschritten, die unsere Aufmerksamkeit
> verdienen: wir ueberschreiten eine Grenze, wo
> wir von unbegrenzten Inventaren uebergehen zu
> begrenzten, und eine zweite Grenze, wo wir von
> Zeichen uebergehen zu Zeichenteilen, die selbst
> nicht Zeichen sind.

Hjelmslev thus divides all linguistic forms into two

classes: one class which contains elements which are
infinite in number and another one which contains
categories finite in number. He also tells us which
categories go into which class:

> Wenn der Text unbegrenzt ist, d.h. durch
> staendiges Hinzufuegen weiterer Teile
> verlaengert werden kann, wie es fuer eine
> lebende Sprache, als Text aufgefasst, der Fall
> sein wird, dann wird man eine unbegrenzte Anzahl
> von Perioden, eine unbegrenzte Anzahl von
> Saetzen und eine unbegrenzte Anzahl von Woertern
> registrieren koennen. (Hjelmslev (1974, 46))

Note, first that Hjelmslev refers to language here as a
text, not as a system for the production of texts, as
Weydt wrongly attributes to him. But what is important for
us is that Hjelmslev indeed claims that the whole language
interpreted as one long text consists of among others
infinitely many sentences. And he must mean: infinitely
many distinct sentences, i.e. we do not count repetitions,
for if we would count repetitions of the same elements,
then his dichotomy of categories with infinite and finite
members doesn't make sense, for then languages will also
contain infinitely many syllables, a claim he explicitly
denies on the same page we found the last quotation on.
Weydt is thus wrong again: Hjelmslev joins the group of
linguists claiming that natural languages contain
infinitely many sentences. And we do not have to engage in

a costly search to find that the claim about the other
linguistics mentioned is also just false. Weydt quotes from
a paper by Martinet that something (Weydt doesn't give the
full sentence) has infinitely many messages. From this he
concludes that Martinet would never have thought of
claiming that languages contain infinitely many
sentences. Wrong again: in his famous book Elements
of General Linguistics we find the following statement
on page 28:

> The number of possible sentences in each
> language is theoretically infinite, for there is
> no limit to the number of successive monemes
> which a given sentence may comprise.

So, Weydt goes into exactly the same trap as Leppin and
Baumann: from the fact that an author makes a statement
which is incompatible with a certain interpretation it
does not follow that the same author does not make a
different statement elsewhere which is compatible with
this interpretation. Weydt's case is of course more
extreme than the other two, since his whole project is to
accuse Chomsky of having taken an idea from somebody else
and in addition having taken it incorrectly. I guess it is
fair to say that we either fundamentally misunderstand
Weydt's statements or we are forced to arrive at the
conclusion that the reader of Weydt's work better check

his claims very carefully.

Let us just take a look at the work of the last
linguist mentioned in Weydt's list of people who deny that
human languages contain infinitely many sentences. This is
Buehler. We give Weydt's quotation first. It turns out
that Weydt here follows a habit which Chomsky unfortunately
shares with him sometimes, namely he quotes quite
selectively. If one looks at the full quote, which follows
after the extract, then the picture looks slightly
different:

> ... wir alle koennen ... ins Unuebersehbare
> Neues und immer Neues intersubjektiv
> verstaendlich sprachlich zur Darstellung bringen
> ...
>
> Denn wir alle koennen nicht darum praktisch ins
> Unabsehbare Neues und immer Neues intersubjektiv
> verstaendlich sprachlich zur Darstellung
> bringen, weil wir und die anderen Akrobaten der
> Mnemotechnik waeren, sondern weil dies bei einem
> Feldsystem vom Typus der Sprache gar nicht
> verlangt wird. Wir koennen auch Zahlen ins
> Unbegrenzte mit nur zehn Elementarzeichen und
> einer sehr einfachen konventionell festgelegten
> "Syntax" symbolisieren. Die Konvention des
> dekadischen Ziffernsystems lautet: die Ziffern
> enthalten von rechts nach links den Wert von
> Einern, Zehnern, Hundertern ... Was wir hier das
> Mitverwerten, Mitausnutzen der Reihenfolge
> leisten sehen, dasselbe und noch weit Subtileres
> liegt nach Anlage und Leistung in der Syntax der
> Sprache beschlossen. (Buehler 1934,77

Although it is true that Buehler does not talk about
infinitely many sentences of natural language and we do

not know whether he does elsewhere in his book, since we just checked this one quotation, it remains true that in the sentences following his admiration of the linguistic creativity of native speakers he gives an example of how a syntactic algorithm is able to generate a set with infinitely many members, namely the set of all integers.

We can now come back to our main concern: Chomsky's claim that many features of Wilhelm von Humboldt's philosophy of language are Cartesian. One Cartesian property is creativity, or more specific, the ability of the language competence of the native speaker to make infinite use of finite means. It remains to be established whether v. Humboldt's use of this phrase has a meaning that makes it an instance or at least a version of the Cartesian concept, as defined above. We remember that Chomsky had claimed that v. Humboldt had "the idea that a language is based on a system of rules determining the interpretation of its infinitely many sentences" (Chomsky 1965, V). Let us therefore proceed systematically in that we determine first, whether we find passages in v. Humboldt's work where he talks about rules. Then we search the texts for passages which might be related to the question of creativity.

The next passage shows v. Humboldt's concern about

the generation of sentences, the "Bildung des Satzes" and
the "Formation":[3]

> Die Physiologie der Sprachen muss, um bei der
> Grammatik stehen zu bleiben, lehren , wie sie
> zum Zweck aller Sprache, zur Bildung des
> Satzes, und, durch Verknuepfung der Saetze,
> der Periode gelangen; damit haengt
> groesstentheils die grammatische Behandlung der
> Redetheile, die Formation, zusammen, diese
> aber weiter mit dem Lautsystem. (IV, 10f;
> emphasis added)

In the Ankuendigung einer Schrift ueber die Vaskische
Sprache und Nation we find the following description of
the task of linguistics (the "Zergliederung" of language):

> So besteht jede Sprache auf der einen Seite aus
> einer grossen Menge analogisch gebildeter
> Reihen, auf der andren aus Grundstoffen, von
> denen sich weiter keine Rechenschaft geben
> laesst.
>   Diesen zwiefachen Bestandtheil der
> Sprache nun muss eine gelungene Zergliederung
> derselben vollstaendig und genau nachweisen,
> jede Spur systematischer Regelmaessigkeit
> verfolgend, die Sprache nach allen Richtungen
> hin untersuchen ... Ihr letztes Resultat ist
> alsdann ein zwiefaches: ein System mehr, oder
> weniger allgemeiner und sicherer Regeln,
> Grundsaetze und Analogien, der eigentliche
> Organismus der Sprache, und eine gleichsam
> unorganische Masse von nicht weiter zerlegbaren
> Sprachelementen. (III, 297f; emphasis added)

And in the "Grundzuege des allgemeinen Sprachtypus" we
find the requirement that every grammar should "von dem

Lautelement bis Bildung des Satzes schrittweise

aufsteigen" (V, 371). This is of course exactly the

conception of grammar that Chomsky[4] has developed in

Chomsky (1955), where the grammatical description of a

sentence is defined as the set of representations on

linguistic levels (phonemic, syntactic etc.) determined by

the rules of grammar. The similiarity of these two views

is quite striking, especially if one looks at v.

Humboldt's actual practical grammatical research. In the

less metatheoretical and more data-oriented writings of v.

Humboldt one finds a systematic approach which is both

structured and unambiguous in its terminology, so that the

following assessment of Chomsky's work by Gardner in his

recent overview of Cognitive Science might as rightfully

be applied to v. Humboldt as to Chomsky:

> [he] approached this task with a seriousness of
> purpose, an arsenal of logical and mathematical
> tools, a finesse and a finality of argument that
> had simply not been marshaled hitherto in
> linguistic analysis. (Gardner 1985, 188)

Of course v. Humboldt's writings lack the mathematical

approach to the analysis of language, but the reason for

this is of course that in his days the algebraic means for

a formal treatment of language had not yet been developed.

But even without these means, v. Humboldt's analyses

achieve a remarkable clarity, range of explanation and
systematicity. We will come back to some of these elements
later.

Note the following very interesting passage from
his "attempt of an analysis of the mexican language",
which describes the general goal of linguistic theory.
Reading this passage, one might be tempted to turn the
book twice to make sure that one is reading the collected
works of v. Humboldt, rather than some programmatic work
of Generative Grammar:

> Allerdings aber fordert dies Studium auf diese
> Weise anstellen zu koennen, Vorarbeiten, welche
> jetzt nicht vorhanden sind, und ihre methodische
> Verknuepfung in ein System, das alsdann als eine
> Encyclopaedie der gesammten Sprachkunde gelten
> koennte... Philosophisch muesste eroertert
> werden, worin eigentlich der Organismus der
> Sprache besteht, und darauf geschichtlich, wie
> vielerlei Arten desselben die Sprachkunde
> aufzuzaehlen weiss. In diesem ersten allgemeinen
> Theile wuerden nicht, wie im zweiten die
> Sprachen durch alle Theile ihres Baues, sondern
> diese Theile durch alle Sprachen verfolgt. Man
> erhielte daher hier die Aufzaehlung aller
> menschlichen Sprachlaute, die Beschreibung und
> Geschichte der Declination, des Verbi durch alle
> Zeiten und Voelker... Auf dies Zusammennehmen
> aller Sprachen folgte die Absoderunng der
> einzelnen. Hier wuerden sie ihren
> Verwandtschaften nach classenweise aufgestellt,
> alle ihre Elemente, Formeln, Regeln in ihnen
> zu einem Ganzen vereinigt, und der individuelle
> Charakter, die individuelle Weltvorstellung
> daraus hergeleitet. (IV, 252f; emphasis added)

In the same work we even find the clear statement that a

grammar is nothing else than the collection of all the
generalizations of a language that can be expressed by
rules, which is of course only a reformulation of the idea
that a grammar is a set of rules specifying the form and
interpretation of the sentences of a language:

> Ich werde nun zeigen, wie aus denselben
> [Wortelementen; G.W.] die Woerter, deren sich
> die Rede bedient, sie moegen einfache, oder
> zusammengesetzte seyn, gebildet und hernach wie
> die so gebildeten Woerter zu der
> zusammenhaengenden Rede verbunden werden. Das
> letztere ist das bestimmte und eigentliche
> Geschaeft der Grammatik, obgleich man auch das
> erste, die Bildung von Substantiven aus Verbis,
> von Adjektiven aus beiden u.s.f. wohl mit in die
> Grammatik aufnimmt, und Alles in ihr
> zusammenfasst, was sich auf Regeln
> zurueckbringen laesst. (IV, 261; emphasis
> added)

That Wilhelm von Humboldt was a Generative Grammarian,
even in the most modern sense of the word and not just in
the sense that every grammarian ipso facto that he is a
grammarian has to be a generative grammarian comes out in
his emphasis to make infinite use of finite means in the
production of linguistic forms. In the next paragraph he
talks about the production of words by a speaker which is
not explainable by memory capacities. It is claimed that
in actual daily discourse a speaker has the capacity to
generate form because he has internalized the "key for the
production of words", but this key of course is the

generative rule system whose output is an infinitude of

grammatical forms, be they words or sentences:

> Man kann den Wortvorrat einer Sprache auf keine
> Weise als eine fertig daliegende Masse ansehen.
> Er ist, auch ohne ausschliesslich der
> bestaendigen Bildung neuer Woerter und
> Wortformen zu gedenken, so lange die Sprache im
> Munde des Volks lebt, ein fortgehendes
> Erzeugnis und Wiedererzeugnis des
> wortbildenden Vermoegens, zuerst in dem Stamme,
> dem die Sprache ihre Form verdankt, dann in der
> kindischen Erlernung des Sprechens und endlich
> im taeglichen Gebrauche der Rede. Die
> unfehlbare Gegenwart des jedesmal notwendigen
> Wortes in dieser ist gewiss nicht bloss Werk des
> Gedaechtnisses. Kein menschliches Gedaechtnis
> reichte dazu hin, wenn nicht die Seele
> instinktartig zugleich den Schluessel zur
> Bildung der Woerter selbst in sich truege. (v.
> Humboldt 1973, 99; emphasis added[5])

This kind of paragraph is especially instructive for our

purposes. Of course it is true that v. Humboldt talks

about diachronic facts of language very often, in

particular in his metatheoretical works. But it is a

mistake to assume that he wouldn't have thought about

synchronic aspects of natural language, in fact we know

that it is impossible to make statements about diachrony

before an analysis of the synchronic states of the language

one is comparing or mapping on each other. If one reads v.

Humboldt carefully, then one finds a host of passages like

the one quoted, where he explicitly ensures that his claim

of a faculty of productive generation of linguistic forms
(the "Schluessel zur Bildung der Woerter") is part of the
everyday compentence of a speaker ("im taeglichen
Gebrauche der Rede"). To overlook such paragraphs just
means to overlook a whole dimension of v. Humboldt's work.
This is the main objective of our ambiguity hypothesis: v.
Humboldt's work has a much greater extension than the
people who reject Chomsky's interpretation are willing to
admit, but that subjects them to the criticism that they
have not grasped the complete dimension of the oeuvre of
the founder of linguistics as a discipline separate from
philosophy and psychology.

It is thus Chomsky's merit to have contributed to a less
biased view of v. Humboldt's work, a view that does not
unilaterally stress his interest in diachronic and mystical
aspects of language while supressing his fundamental
findings on the nature of the human language competence.
Both aspects of his work are valid and should not be
denied.[6]

To finish this section on v. Humboldt's conception
of linguistic rules, let me quote a little passage from
his "Berichtigungen und Zusaetze zum ersten Abschnitte des
zweiten Bandes des Mithridates ueber die Cantabrische oder

Baskische Sprache", where we find him as an active linguistic researcher again, which gives us a chance to witness his style in practice. Summing up some treatments of Vaskic conjugation in other grammar he complains about Larramendi's treatment which seems to me to express his complete contempt for structuralist-type search for paradigms:

> Man findet bei ihm also nur Paradigmen, von den
> Regeln aber, welche den Sprachforscher am
> meisten interessieren, nur einen sehr kleinen
> Theil. (III, 258)

We can sum up our findings so far: there is strong textual evidence for Chomskys claim that v. Humboldt did in deed believe that a grammar should be a set of rules which capture the generalization of the form of the language. He considered paradigms not interesting for a grammar and believed that the faculty of a speaker to produce a wealth of linguistic forms in daily speech cannot be explained by retrieval from memory storage but has to be accounted for by the postulation of a grammatical rule system represented within the speaker. Having established v. Humboldt's belief in the existence of a grammatical rule system we can now proceed one step further to ask whether he believed in the claim that a speaker equipped with such a rule system would be able to generate infinitely many

grammatical forms. Chomsky had only attributed to v.

Humboldt the belief that this grammatical rule system

would generate infinitely many sentences. We will go one

step further in that we will check whether he believed

that the grammar would generate infinitely many forms, be

they sentences or words, for this latter distinction is

quite irrelevant for the purposes of Cartesian

linguistics. The aspect of creativity, the capacity to

make infinite use of finite means, can be demonstrated

with both sentences and words, and if v. Humboldt held one

or the other or both, then this shall be sufficient for us

to call him a Cartesian linguist.

We remember that Weydt had claimed that v.

Humboldt had not talked about sentences when he wrote

about infinity:

> Fuer Humboldt besteht der unendliche Gebrauch
> der Sprache darin, dass es unendlich viele
> Gedanken oder denkbare Sachverhalte gibt, die
> man alle mit der Sprache ausdruecken kann. Ueber
> die Zahl der Saetze hat er sich nicht
> geaeussert. (Weydt 1976, 57)

We had already noticed that Weydt's textual claims about

Hjelmslev, Martinet and Buehler failed and we are now

forced to admit that his interpretation of v. Humboldt is

problematic, too. Note the following quotation:

> Zwar laesst die grammaticalische und
> lexicalische Form, und die ganze Woertermasse
> einer Sprache, wenn sie auch gewisse Regeln
> und Bildungen fest bestimmt, doch in der
> Anwendung eine unendliche Menge von
> Modificationen zu, und gewaehrt dem Geiste immer
> noch eine grosse Freiheit. (IV, 246; emphasis
> added)

The subject of this paragraph is clearly the rule-governed
formation of grammatical and lexical form, especially
words. We believe that it is plausible that words are
taken only as one paradigmatic example and that v.
Humboldt would extend the validity of this claim to
sentences; we remember his excuse for simplification:

> Ihr [die Sprache; G.W.] Element, das Wort, bei
> dem wir der Vereinfachung wegen stehenbleiben
> koennen ... (1973, 138)

To make sure that we are not misunderstood: I am not
claiming that v. Humboldt claimed only the output of the
grammatical formation process of linguistic form to be
infinite. Of course Weydt is right in assuring that v.
Humboldt also believed the set of thoughts that a person
can think to be infinite. But this is another shortcoming
of Weydt's v. Humboldt-interpretation: given v. Humboldt's
strong linguistic relativism, i.e. his claims about the
paralellism and interaction, if not identity of thought
and language, it follows that the following argument is
valid:

A: There are infinitely many thought-units

B: There is a strong paralellism between thought-units and
   linguistic units

   .

C: There are infinitely many linguistic units

We do not have to find textual evidence that v. Humboldt

held proposition A, since this is universally accepted.

If, however, we can find evidence for a belief in B in his

writings, or even a stronger proposition than B, maybe B':

"We think in language", than C has to be true, too. We

shall now try to find evidence that v. Humboldt held

propositions like B which make the above argument valid

and support Chomsky's claim that v. Humboldt believed that

a grammar should be a rule system generating infinitely

many linguistic forms. In his announcement of a treatise

on the Vaskic language and nation we find the following

description of the goal of his grammatical work:

>   Ich werde hierbei eine, so viel
>   moeglich, kurze, aber systematische und
>   erschoepfende Methode zu waehlen suchen, um, so
>   weit es geschehen kann, keine Seite unberuehrt
>   zu lassen, welche zum Vergleichspuncte dienen
>   kann, und einen vollstaendigen Begriff nicht nur
>   von dem grammatikalischen, sondern auch
>   lexikalischen Bau des Vaskischen zu geben; erst

> das Verhaeltnis aller Theile der Sprache zu
> einander, und dann der ganzen Sprache, als
> Darstellungsmittel, zu ihrem Gegenstande,
> demjenigen was dargestellt werden soll
> (obgleich diess nie von ihr selbst geschieden
> werden kann), auseinanderzusetzen. (III, 294;
> emphasis added)

v. Humboldt states often that for him language has the task of functioning as a means for the expression of thought.

> "Der Mensch denkt nur vermittelst der Sprache
> ..." (IV, 26)[7]

> Das Denken, welches vermittelst der Sprache
> geschieht, ist entweder auf aeussre,
> koerperliche Zwecke, oder auf sich selbst, also
> auf geistige gerichtet. (v. Humboldt (1985, 67))

For him, language is a "Darstellungsmittel", a means of representation, for the content of thoughts. But in the above quotation he claims that one cannot really separate these two dimensions of human activity: language and thought are not really two distict dimensions, they are realizations of one and the same underlying phenomenon, of the expressive capacity of the human species. The same point is made in the next quotation:

> Man muss sich nur durchaus vo der Idee
> losmachen, dass sie [die Sprache; G.W.] sich so
> von demjenigen, was sie bezeichnet absondern
> lasse, wie z.B. der Name eines Menschen von

seiner Person ... (III, 296)

At another occasion the phenomenon of written language is described. Here we learn that the thought is even formed by language:

> Denn die Schrift, auch da, wo sie sich noch am wenigsten vom Bilde unterscheidet, ist doch immer nur Bezeichnung des schon durch die Sprache geformten Gedanken. (V, 35)

And if there is a strong paralellism or maybe even an identity between thoughts and linguistic form, then thoughts themselves may or must have a form, not only content:

> dass der Charakter der vollkommner gebildeten Sprachen dadurch bestimmt wird, dass die Natur ihres Baues beweist, dass es dem Geist nicht bloss auf den Inhalt, sondern vorzueglich auf die Form des Gedanken ankommt. (V, 110f)

I can understand this previous quotation only as follows: languages have a certain "Bau" (structure) and the "Geist" (mind) knows this structure and operates and manipulates this structure. This structure is in fact not only a structure of the sentences of the language which are independent of the content and structure of thoughts, but rather the structure of the language and the operations of the mind manipulating this structure operates on thoughts

to give them form and to manipulate it. There is no
difference between thoughts and sentences, the grammar
determines the form of both sentences and thoughts. If
this is not the correct interpretation, then I do not
understand the following quotation from v. Humboldt's work
on the grammatical structure of the Chinese language:

> Die Grammatik ist mehr, als irgend ein anderer
> Theil der Sprache, unsichtbar in der Denkweise
> des Sprechenden vorhanden ... (V, 311)

If this is not the correct interpretation, then it also
remains mysterious to me what is meant by the phrase
"grammatische Ideenverknuepfung" (IV, 10f). It seems to me
that if our interpretation is not the right one then this
phrase should be meaningless. In the next quotations v.
Humboldt even alternates between "sentence" and "thought",
and he can do that, since for him they are
interchangeable:

> Die Wortstellung ist, ohne in einer Sprache mit
> andren Huelfsmitteln der grammatischen
> Bezeichnung verbunden zu werden, ausser Stande,
> anzudeuten, in welcher bestimmten grammatischen
> Form jedes Wort eines _Satzes_ genommen werde
> muss, ja nur ueberhaupt alle Theile des
> _Gedanken_ unverkennbar zu bezeichnen. (IV,
> 319)

> Von da aus verbreitet sich aber der wohlthaetige
> Einfluss eines reichen grammatischen Formenbaues
> ueber das ganze _Denksystem_. Diese so
> unbedeutend erscheinenden Formen erlauben, indem

> sie Mittel darbieten, die <u>Saetze</u> zu
> erweitern und zu verschlingen, dem Geiste einen
> freieren Schwung. (IV, 322; emphasis added)
>
> Wenn es mir gelungen ist, die Flexionsmethode in
> ihrer ganzen Vollstaendigkeit zu schildern, wie
> sie allein dem Worte vor dem Geiste und dem Ohre
> die wahre innere Festigkeit verleiht und
> zugleich mit Sicherheit die Teile des
> <u>Satzes</u>, der notwendigen
> <u>Gedanken</u>verschlingung gemaess,
> auseinanderwirft, so bleibt es unzweifelhaft,
> dass sie ausschliesslich das reine Prinzip des
> Sprachbaues in sich bewahrt. (v. Humboldt (1973,
> 130)[8])

We have argued above in connection with the formal argument we drew that if v. Humboldt held propositions A and B, then he would also be forced to hold the conclusion C, namely that there are infinitely many forms of a language which accompany the thoughts of a person. Everybody assumes that v. Humboldt did hold proposition A, there was no controversy over this point to begin with. Now we have given strong textual evidence that v. Humboldt also held B, so that he is forced to hold the conclusion as well. One might wonder, whether v. Humboldt was really <u>forced</u> to hold C, or whether he wouldn't have been quite willing to do so anyway, given the tight relationship he postulated between language and thought. Aren't there any clear quotations, where he links up language and thought and talks at the same time about infinity? In fact there is one, and as we expect, v.

Humboldt just sums up the logic of the argument that we
gave above:

> Denn die Neigung, eine Vielfachheit fein und
> scharf abgegrenzter Artikulationen zu bilden,
> und das Streben des Verstandes, der Sprache so
> vile und bestimmt gesonderte Formen zu schaffen,
> als sie deren bedarf, um den in seiner
> unendlichen Mannigfaltigkeit fluechtigen
> Gedanken zu fesseln, wecken sich immer
> gegenseitig. Urspruenglich, in den unsichtbaren
> Bewegungen des Geistes, darf man sich, was den
> Laut angeht, und was der innere Sprachzweck
> erfordert, die bezeichnenden und die das zu
> Bezeichnende erzeugenden Kraefte auf keine Weise
> geschieden denken. Beide vereint und umfasst das
> allgemeine Sprachvermoegen. (v. Humboldt (1973,
> 80))

This clearly shows that Weydt's interpretation of v.

Humboldt is wrong and that Chomsky's interpretation is

correct. v. Humboldt does in fact claim that the human

mind has the desire to express thoughts and that there are

infinitely many possible thoughts. Since man possesses the

"allgemeine Sprachvermoegen" (general linguistic

competence), he is able to generate both the content and

the form of those thoughts and sentences. And by

"erzeugen" v. Humboldt here means among others the process

of form production, i.e. the production of linguistic

forms like sentences and words. Note, in particular, that

it does not make any sense in this quotation to interpret

"to generate" in a diachronic way. Especially Leppin had

argued that Chomsky misinterpreted v. Humboldt's term "to

generate" which allegedly was only used to mean the
historical self-recreation of a language and not in its
algebraic sense familiar from modern mathematical
linguistics. But in this quotation the generating forces
are generating something that refers and at the same time
something that is referred to. But if the output of the
generation process, as is certainly the case in other
passages, were a recreated grammatical system, then it
would be nonsense to say that the rule system refers to
something. Rule systems, as we said, did play an important
role in v. Humboldt's philosophy of language and in his
linguistic work, but v. Humboldt certainly thought of them
as expressing linguistic generalizations and as
representing the "Sprachvermoegen" of a human being. To
attribute to him the nonsensical claim that grammars are
referential, cannot be in the interest of anybody. Leppin,
like all the gratuitous authors mentioned in this thesis,
has thus overlooked many clear passages in v. Humboldt's
writings and has failed to notice the full spectrum of
arguments put forward by v. Humboldt. We will complete the
discussion about what Chomsky called "the creative aspect
of language use" by just collecting several quotations
from different works by v. Humboldt, which also show that
he held the view that a grammar of a language should
generate infinitely many forms. The following quotations

differ from the ones above in that they do not depend on the argument of a close paralellism between language and thought. Here we get clear and I believe unambiguous statements about linguistic form and what has come to be called "weak generative capacity" of the grammars of natural language:

> Es vereinigen sich also im Menschen zwei
> Gebiete, welche der Theilung bis auf eine
> uebersehbare Zahl fester Elemtente, der
> Verbindung dieser aber bis ins Unendliche
> faehig sind, und in welchen jeder Theil seine
> eigenthuemliche Natur immer zugleich als
> Verhaeltnis zu den zu ihm gehoerenden darstellt.
> Der Mensch besitzt die Kraft, diese Gebiete zu
> theilen, geistig durch Reflexion, koerperlich
> durch Articulation, und ihre Theile wieder zu
> verbinden, geistig durch die Synthesis des
> Verstandes, koerperlich durch den Accent,
> welcher die Silben zum Worte, und die Worte
> zur Rede vereint. (IV, 4; emphasis added)

> Denn jede Sprache ist unendlicher Natur, und
> erlaubt daher nicht, dass sie je vollstaendig
> ergruendet, und noch viel weniger vollstaendig
> dargestellt werde. (v. Humboldt (1973, 12))

> Mit diesen Elementen aber will die Rede die
> zahllosen Kombinationen des gefluegelten
> Gedanken, ohne in ihrer Unendlichkeit
> beschraenkt zu werden, erreichen. Dem Ausdrucke
> aller dieser Verknuepfungen liegt die
> Satzbildung zum Grunde, und es ist jener
> freie Aufflug nur moeglich, wenn die Teile des
> einfachen Satzes nach aus seinem Wesenn
> geschoepfter Notwendigkeit, nicht mit mehr oder
> weniger Willkuer aneinander gelassen oder
> getrennt sind. (v. Humboldt (1973, 121);
> emphasis added)

We have thus established that v. Humboldt has held

many of the positions which we take to define the construct "Cartesian linguistics". In particular he believed that our knowledge of language is determined by the internalization of a grammatical rule system which is able to generate infinitely many forms of the language which refer to thoughts. The rule system itself is finite however, so that it was his conviction that every speaker of a language makes infinite use of finite means. The main purpose of language is to serve as an expression of thought and the linguistic competence of the speaker, i.e. the knowledge of a rule system accounts for the creative aspect of this use of language.

In the last section of this chapter we will roam a little in the works of v. Humboldt to determine whether we might not find evidence for more Cartesian linguistic positions. Cartesian linguistics is concerned with an explanation of the human language faculty, i.e. we saw in 3.1 that Cartesian linguistics tries to find an answer to the question: "How is knowledge of language acquired?" The best answer that is available to this question today seems to be the following according to most Cartesian linguistists: natural languages have complex structural properties which have to be detected by linguists in difficult empirical investigations. Knowledge of a

language is the first order knowledge of understanding and producing an infinite amount of grammatical forms belonging to the language on the basis of an internalized system of rules and principles. Given the uniformity of this first order knowledge across the species and given furthermore the problem that the actual rule system is tremendously underdetermined by the primary data available to the language learner, Cartesian linguists attribute a second-order capability to human beings. This second-order knowledge which is referred to as "Universal Grammar" is the ability to analyze structured primary data of experience in predetermined ways. The second-order knowledge which consists of a set of highly abstract principles and parameters governing the structure and the use of language interacts with the information contained in the primary data to form the first order knowledge described above. The fundamental principles governing ultimately the linguistic competence and behavior of an organism have universal validity because of biological necessity (rather than logical necessity), i.e. because they are part of the initial state of the mental structure of every member of the human species.

Is there any evidence that v. Humboldt might have agreed with this general point of view? There is plenty. In fact, it seems that v. Humboldt makes even more radical

claims: not only did he hold that the human capacity for linguistic behavior is innate, but in addition he held the view that specific knowlege about specific languages is innate, i.e. German children are born with a certain knowldege about German etc. This fact is stressed in the main stream interpretation of v. Humboldt's work (cf. for example again Baumann's paper), but this interpretation is biased again: it is correct that v. Humboldt believed in the innateness of certain linguistic specifics of one language, but he certainly believed that humans are also born with a knowledge of linguistic aspects independent of the specific language their people speaks. This comes out clearly in the following passage, where he carefully distinguishes these two aspects:

> Bei der Beurtheilung der Nationalanlage in der
> Spracherfindung ist aber wieder eine besondre,
> individuelle von der in der menschlichen Natur
> ueberhaupt liegenden zu unterscheiden. Denn die
> Sprache im Allgemeinen ist das Erzeugnis eines
> menschlich intellectuellen Instincts, und
> insofern bedingt durch die allgemeine Anlage der
> Organe, und des Denk- und Empfindungsvermoegens.
> Was mit diesen an sich uebereinstimmend ist,
> kann daher nicht auf Rechnung besondrer
> geistiger Individualitaet geschrieben werden.
> (IV, 18)

This knowledge which is common to all members of the human species is the "Sprachvermoegen" which we had already come across on different occasions. And it is exactly this

human capacity, the "Sprachvermoegen" which lingustics as a new science independent of philosophy has to study and explain:

> Diese Hauptaufgabe, so weit es geschehen kann, zu loesen, die Sprachfaehigkeit des Menschengeschlechts auszumessen, muss das eigentliche Geschaeft einer Einleitung in das gesamte Sprachstudium sein. (v. Humboldt (1973, 14); emphasis added)

For v. Humboldt, as for the Cartesian linguist in general, languages are not studied for their own sake. The study of language is just a tool for a study of the structure of the human mind. We try to account for the human linguistic capacity, i.e. the questions (a) What constitutes knowledge of a language? (b) How is this knowledge acquired? and (c) How is this knowledge put to use? - in order to determine how this linguistic competence interacts with other cognitive capacities of man. v. Humboldt articulates exactly this viewpoint and the following passage could well have been taken from Chomsky's writings, but it is in fact taken from v. Humboldt and was written more than 170 years ago:

> Ohne daher ueber diesen ganzen Gegenstand eine neue, eigne, in sich vollstaendig, und im Zusammenhange mit allen angrenzenden Gebieten durchgefuehrte Untersuchung aufs neue anzustellen, wird es nie moeglich sein, das Sprachstudium auf eine wahrhaft fruchtbringende

Weise in die uebrigen menschlichen Kenntnisse
eingreifen zu lassen (1973, 15f)

The structure of the mind and human creativity are closely
correlated. Since language has the primary function of
expressing thought ("Die zunaechstliegende, aber
beschraenkteste Ansicht der Sprache ist die, sie als ein
blosses Verstaendigungsmittel zu betrachten" (v. Humboldt
(1973, 21)) an analysis of the universal aspects of
language allows conclusions about the structure of thought
and human creativity; but this creativity is not
unbounded. The universal aspects of language also
constrain the products of the human mind, otherwise the
mind would entertain all possible hypotheses and would not
be able to attain any knowledge at all:

> Jede Sprache setzt dem Geiste derjenigen, welche
> sie sprechen, gewisse Grenzen, schliesst,
> insofern sie eine gewisse Richtung gibt, andre
> aus. Die Erforschung aller Sprachen kann daher
> darauf fuehren, zu sehen, welches der weiteste
> Aufflug ist, den eine gestattet, und auf welche
> Weise die Grenzen des menschlichen Geistes von
> dieser Seite gleichsam historisch zu bestimmen
> sind. (v. Humboldt (1973, 14))

The next passage makes the same point and again one has
the impression that one is reading a work from the second
half of the twentieth century, rather than one from the
first half of the nineteenth:

> ... vermutlich ist der eigentliche Grund der
> Vielheit der Sprachen das innere Beduerfis des
> menschlichen Geistes, eine Mannigfaltigkeit
> intellektueller Formen hervorzubringen, welche
> ihre Schranke auf uns gleich unbekannte Weise,
> als die Mannigfaltigkeit der belebten
> Naturbildungen, findet. Will man diese
> Aenlichkeit weiter verfolgen; so laesst sich
> vielleicht auch behaupten, dass eigentlich neue
> Sprachen nicht mehr entstehen; allein Spielarten
> viel mehr als in der, ueberhaupt weit fester
> begrenzten physischen Natur. (v. Humboldt (1973,
> 13))

So we find an interesting dialectic between the infinite

creativity of human thought and language as the carrier of

this thought and the constraints that are put on this

creativity by the structure of the human mind and the

human organs in general:

> Wiewohl alle Sprachen im Ganzen ungefaehr
> denselben Bau haben, und gleichen Gesetzen
> folgen, so giebt es doch schwerlich eine, die
> sich nicht noch durch eine besondre
> Eigenthuemlichkeit von den anderen
> unterschiede... Allein alle einzelne Sprachen
> finden sich zusammen, alle noch so
> entgegengesetzte Eigenthuemlichkeiten vereinigen
> sich in dem Sprachvermoegen des Menschen. Dieses
> Vermoegen ist der Mittelpunkt des
> Sprachstudiums... Wir haben daher darin ein
> Gebiet, das, neben der allgemeinen
> Gleichfoermigkeit, innerhalb seiner Graenzen
> eine ganz unbestimmbare, und weit
> unerschoepfliche Mannigfaltigkeit bewahrt. Doch
> auch dies Gebiet ist scharf begraenzt einmal
> durch die Natur der Sprachen, als Werkzeuge, die
> aus einer bestimmten Zahl von Lauten bestehen,
> und nur eine bestimmten Anzahl von Verbindungen
> dieser zulassen; dann durch die Natur des
> Menschen, die Beschaffenheit seiner Organe, und
> den moeglichen Umfang seiner Faehigkeit
> wahrzunehmen, zu denken, und zu empfinden;

> ferner durch die unabaenderlichen Gesetze der
> allgemeinen Ideen ... (IV, 243)

But the "Sprachvermoegen" is a truly human property, no other species has this capacity. One of the most important arguments for the Cartesian dualism is represented by the difference between beasts and humans. v. Humboldt repeats exactly this Cartesian argument:

> Auch laesst sich die Articulation der Toene, der ungeheure Unterschied zwischen der Stummheit des Thiers, und der menschlichen Rede nicht physisch erklaeren. (IV, 4; emphasis added)

Like Descartes, v. Humboldt notes that deaf mutes display linguistic capabilities and construes this as a decisive argument that it is not just the absence of the proper organs of speech which makes animals incapable of speaking. Rather it is the "Sprachvermoegen" which they lack and which is part of the human mind:

> Die Sprache aber liegt in der Seele, und kann sogar bei widerstrebenden Organen und fehlendem aeusseren Sinn hervorgebracht werden. Dies sieht man bei dem Unterrichte der Taubstummen, der nur daduch moeglich wird, dass der innere Drang der Seele, die Gedanken in Worte zu kleiden, demselben entgegenkommt, und vermittelst erleichternder Anleitung den Mangel ersetzt, und die Hindernisse besiegt. Aus der individuellen Beschaffenheit dieses Dranges, verstaendliche Laute hervorzubringen, aus der Individualitaet des Lautgefuehls ... und endlich aus der Individualitaet des Gehoers und der

Sprachwerkzeuge entsteht das besondre Lautsystem
jeder Sprache, und wird, sowohl durch seine
urspruengliche Gleichartigkeit mit der ganzen
Sprachanlage des Individuums, als in seinen
tausendfachen einzeln gar nicht zu verfolgenden
Einfluessen auf alle Theile des Sprachbaues, die
Grundlage der besondren Eigenthuemlichkeit der
ganzen Sprache selbst. (IV, 117)[9]

Language has other properties as well. v. Humboldt picks

up Leibnitz's idea that language is a mirror of the mind,

i.e. from the structure of language we can infer the

structure of the mind:

Die Sprache ist aber durchaus kein blosses
Verstaendigungsmittel, sondern der Abdruck des
Geistes und der Weltansicht der Redenden, die
Geselligkeit ist das unentbehrliche Huelfsmittel
zu ihrer Entfaltung, aber bei weitem nicht der
einzige Zweck, auf den sie hinarbeitet, der
vielmehr seinen Endpunkt doch in dem einzelnen
findet, insofern der einzelne von der Menschheit
getrennt werden kann. (v. Humboldt (1973, 22))

This is a most beautiful picture and shall stand at the

end of our journey through more than three centuries of

Cartesian philosophy and the study of language: Descartes

made it the basis of his language test, v. Humboldt

articulated this idea in the early nineteenth century and

Chomsky revived the position in the second half of the

twentieth century developing it to an explanatory

scientific theory: each individual member of the human

race shares with all others the "Sprachvermoegen" and

conversely the "Sprachvermoegen" essentially delimits humanity.

Footnotes of Chapter III

1.   Chomsky did not really give a formal definition in his
book and we will not do so either in this thesis, since it
is hard to see who could benefit from such a definition.
We just want to stress the point that if either we or
Chomsky had to give a definition, it would of course be a
nominal definition not a real one, for as Arnauld (1662,
164f) writes:

> Unlike nominal definitions, real definitions are
> not arbitrary but must reflect the nature of the
> referent of the defined word.

But "Cartesian Linguistics" doesn't refer in the real
world and therefore a real definition would be void of
empirical content. Note therefore, that if either we or
Chomsky were attacked on the grounds that the definition
of "Cartesian Linguistics" is historically inadequate etc.
this would be as irrelevant as the claim that the nominal
definition of "Cartesian product" as a set of ordered
n-tuples is wrong. Such a definition cannot be wrong, due
to its very status as a definition.

2.   This point is often overlooked when Chomsky's works
are discussed in this respect. Although the views of
defenders of generative grammar are grossly misrepresented
quite frequently (we will give some examples below in the
main text; cf. also my "Ueber das Verhaeltnis von
traditioneller und generativer Grammatik"), this is
particularly true in matters concerning the current
debate. Aarsleff (1970) is a typical case. He writes about
Chomsky (1966):

> I shall make an assumption, which I think will
> be readily granted: namely, that Chomsky is in
> fact attempting to give a historical account and
> is not merely seeking out concepts, statements,
> and arguments in an unhistorical fashion. (571)

This was written four years after Chomsky's book had been
published. On a page that Aarsleff quotes from we find the
following introductory remarks by Chomsky where he
announces that he will limit himself to

> a preliminary and fragmentary sketch of some of
> the leading ideas of Cartesian linguistics with
> no explicit analysis of its relation to current

work that seeks to clarify and develop these ideas.

And on the next page he goes on as follows:

> The important problem is to determine the exact nature of the "capital of ideas" accumulated in the premodern period, to evaluate the contemporary significance of this contribution, and to find ways to exploit it for advancing the study of language. (Chomsky 1966, 2f)

Aarsleff's paper thus misses the topic completely and we will not give it any further attention.

3. The next quotation does in fact not appear in the final version of the text, it was deleted before the work went to print.

4. Hjelmslev (1974) develops a system which might be very similar to Chomsky's if it were formalized.

5. Remember that Buehler (1934,77) had also made the same point.

6. Although different people might put more emphasis on different aspects of v. Humboldt's work, according to their special interest. Nothing is wrong with this as long as one doesn't flatly and wrongly deny that the other interpretation is valid, too.

7. This sentence was actually deleted in a later edition.

8 We find an interesting analogue to this conception of sentence in the works of Herman Paul. In Paul (1919 Vol III, 10) he writes:

> Der Satz ist der sprachliche Ausdruck, das Symbol dafuer, dass die Verbindung mehrerer Vorstellungen oder Vorstellungsmassen in der Seele des Sprechenden sich vollzogen hat, und das Mittel dazu, die naemliche Verbindung der naemlichen Vorstellungen in der Seele des Hoerenden zu erzeugen.

The same definition we find in Paul (1880, 121).

9. A particularly dramatic example of language acquisition by a deaf, mute and blind child is reported in Lorenz (1977) who argues that there are also many facts from

ethology that he and Irenaeus Eibl-Eibesfeld described
which argue for the conception that man is innately
endowed with certain behaviors and faculties. Cf. among
others Eibl-Eibesfeld (1970, 1976). From a biological
point of view, cf. Riedl (1984, 229).

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