PROLEGOMENA TO A LOGIC OF CHANGING THE CONTEXT BY OPERATIONS AND COMMANDS (A CASE STUDY OF OBJECTS OF INTENTION)

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0. Introduction

In performing a series of speech acts like beg, offer, advice, warn, ask, promise, command intentions play a major role. This has been shown by a series of speech act philosophers. From a metaphysical point of view we may ask what the objects of intentions are. This question is dealt with in this paper by means of a more thorough study of one of the speech acts mentioned above, namely commands.

1. A Problem and Two Standard Approaches

What is the meaning, if any, of a sentence like the following ?

(1) WEINE NICHT, KLEINES KIND !
(Don't cry, little baby !)

It must be questioned on different grounds whether there exists a sensible answer to this problem: It can be denied that sentences have meanings at all. ([1]) Even if it is adopted that declarative sentences have meaning, it is perhaps doubted that non-declaratives do have meanings. ([2]) In the present situation the belief that non-declaratives have indeed mean-

([1]) Cf. QUINE (1960) p. 191 ff.

([2]) This is perhaps the view commonly held in philosophy, methodology and logic before Austin's revolutionary «How to do things with words» (1962).

ing became more fashionable, mainly because of Austin's, Grice's, and Searle's work in speech-act theory. ([3]) In order to delineate the present situation more exactly, it is perhaps best to add a few remarks about the recent history of the theory of meaning — or of semantics, as this philosophic and scientific enterprise may be called also.

Frege is regarded as the originator of modern theories of meaning. ([4]) In recent years, in the succession of Tarski's «Der Wahrheitsbegriff in den formalisierten Sprachen,» ([5]) the formal theory of meaning of declarative sentences (and of formulas) was developed rapidly. The theory of meaning — semantics — is based there essentially on the distinction of two linguistic levels — the level of object language and the level of metalanguage — and on conditions, stated in the metalanguage, which determine the circumstances under which a sentence of the object language is true. These conditions are called truth-conditions accordingly. It is regarded as a main issue of semantics to provide for an appropriate definition of the logical truth of sentences and for an appropriate definition of a notion of consequence between sentences of the language.

At first this aim was achieved for the formal languages of logic: for the languages of propositional logic, predicate logic, modal logic, indexical logic and intentional logic, ([6]) epistemic logic, deontic logic. Later on, formal semantics even of fragments of natural language were put forward ([7]).

Now, non-declarative sentences deserve special interest for a semantical theory of natural language, but also for their own. There exist indeed attempts for a semantics of non-declarative sentences. They fall mainly into two classes, the model-

([3]) Cf. AUSTIN (1962), GRICE (1957, 1968), SEARLE (1965).

([4]) Cf. FREGE (1892).

([5]) TARSKI (1935).

([6]) Cf. especially KRIPKE (1963, 1965), HINTIKKA (1962), MONTAGUE (1968), HILPINEN (1971).

([7]) Cf. MONTAGUE (1970a, 1970b), LEWIS (1970), CRESSWELL (1974); cf. also BALLMER (1974).

([8]) Cf. CHELLAS (1969), LEWIS (1970) p. 54-61.

theoretic ([8]) and the speech-act theoretic. ([9]) The first approach is peculiar in the sense that it is based on the claim that there is no essential difference between the semantics of declaratives and that of non-declaratives. The justification for such a view is derived from the assumption that all non-declaratives can be paraphrased by declaratives. Such a paraphrase for (1) would be (according to Chellas' method):

(2) DU SOLLST NICHT WEINEN, KLEINES KIND !
(You ought not to cry, little baby !)

or (according to Lewis' method, which takes performative sentences as corresponding to non-declaratives):

(2') ICH BEFEHLE DIR, KLEINES KIND, NICHT ZU WEINEN.
(I command you, little baby, not to cry.)

Presupposing a deontic logic with a definite-description operator an appropriate formalization of (2) — and hence indirectly of (1) — would be:

(3) $[O \neg Cry(\iota x Small(x) \wedge Child(x) \veebar Adressee(x))]$ ([10])

A standard interpretation of deontic logic (possibly) provides the truth conditions of this sentence and hence ultimately of (1). Using set-theoretical notation we get:

(4) $\wedge i i \varepsilon Ideal\text{-}World \rightarrow ((\wedge a a = \{b \mid \vee b = x(i) \wedge x(i) \varepsilon Small(i) \wedge$
$\wedge x(i) \varepsilon Child(i)) \veebar x(i) \varepsilon Adressee(i)\} \rightarrow card(a) = 1) \veebar$
$\wedge b b \varepsilon a \rightarrow b \varepsilon Cry(i))$ ([11])

The meaning of (1) is regarded as the *condition* of (1) 's being true. And (1) (or (2)) is true if and only if for all ideal worlds it is true that there is exactly one realization of an individual which is a small child spoken at and that this child doesn't cry.

The second approach to treat non-declaratives is represented e.g. by Searle (1965). Following others before him, as he

([9]) Austin (1962), Searle (1965).

([10]) ⌜O⌝ is a deontic operator sign, ⌜Cry⌝, ⌜Small⌝, ⌜Child⌝, ⌜Adressee⌝ are predicate signs, ⌜ ¬⌝ is a negation sign, ⌜x⌝ is a variable and ⌜ιx⌝ is the sign for the description operator binding the variable ⌜x⌝.

points out, he tries to provide a meaning for non-declaratives directly, by distinguishing an illocutionary force and a propositional content and corresponding linguistic devices which indicate force and content respectively. Searle's main concern is to determine *rules* which characterize the relation of linguistic devices used by a speaker in a context to convey meaning to a hearer. Thus the rules for reference, predication and expressing propositions are to be specified. Moreover the same thing has to be done for using force-indicating devices. As a useful start for the latter he proposes Grice's method put forward in his article entitled «Meaning.» ([12])

(5) a speaker s means p by uttering u iff s intended the utterance u to produce some effect in an audience by means of the audience's recognition of s' intention to produce that effect.

This however is inappropriate for the establishment of the necessary and sufficient conditions to specify what a speaker means by an utterance u, as was recognized by a series of writers as Strawson (1964), Searle (1965), Grice (1957), Schiffer (1972). Various proposals of amendment were made. Among these are (a) to account for higher intentions and recognitions of intentions, (b) to distinguish explicitly between one's meaning something by what one says and what that which one says actually means in the language, (c) to study explicitly the connection between meaning and convention (and rules of different kinds such as regulative and constitutive rules), (d) to study the connection between meaning and causing in the audience an activated belief. These methods can be specified for commands as it is done in Searle (1970), especially p. 66, and Schiffer (1972), especially p. 95.

([11]) Where «Ideal-World» is the set of deontically ideal worlds, «Small (i),» «Child(i),» «Adressee(i),» «Cry(i)» are the set of small objects in the world i, the s etof childs in the world i, the set of addressees in the world i and the set of cryingobjects in the world i the set of addressees in the world i and the set of crying objects in the world i respectively. «x(i)» is an individual (or individual realization, if you prefer) in the world i.

([12]) Grice (1957).

2. *A First Conclusion*

The two approaches which aim for a solution of an adequate theory of meaning for non-declaratives — and hence of imperatives like (1) — can be characterized concisely as follows:

(6) The model-theoretic theory of the meaning of non-declaratives is a reduction to a (correspondence-) theory of truth.

(7) The speech-act theory of the meaning of non-declaratives is an attempt to reduce meanings to intentionally producing effects of a certain kind (or even shorter: ... is an attempt to reduce meanings to producing effects of a certain kind).

3. *Further Problems*

A. What is the truthvalue, if any, of a sentence like (1) ? Possible answers are: (a) It is nonsensical to assign any truthvalue. Commands, requests, challenges (and more generally non-declaratives) are neither true nor false ([13]). (b) Non-declaratives can be true or false, like their cognates the declaratives. This parallelism of declaratives and non-declaratives again hinges on the assumption that all non-declaratives can be paraphrased by declaratives. (c) The view that non-declaratives are primarily neither true nor false is adopted. However to use them in a context is to produce effects of a certain kind. It is easily seen that (a) would be a very skeptical and hence a probably unfruitful solution. (b) corresponds to the reductionist view as pursued in model-theoretic approaches. (c) is the solution defended — in a possibly slightly deviant form — by speech-act philosophers. Thus the situation of judging truth or falsehood of non-declaratives is similar to the one before assignment of meanings to non-declara-

([13]) But what then ? Just nothing ? — For a less nihilistic view, see below: (c).

tives. This indicates the similarities of these two problems and hence provides probably a basis for solution.

B. Is there a way to reconcile the purely descriptive approach and the speech-act theoretic approach to the semantic of non-declaratives ? ([14]) To give an answer to this rather delicate question we must provide for a series of distinctions. This will be our next problem !

4. A series of distinctions

A. Take a simple sentence like

(8) FÜNF MAL ZWEI IST DREI_0
(five times two equals three.)

Its truth or falsehood is independent of any context. ([15]) No context must be provided to settle the question of truth for the sentence (8). The truth of the sentence

(9) HEUTE IST DER DRITTE MÄRZ_0
(Today it is the third of March.)

depends on the actual time (and place) — or the time (and place) «built up» in the text in which the sentence occurs. To settle the question of truth, a context to which the sentence is related must be provided. The truth of the sentence is, however, independent of its being used. This is not necessarily the case with

(10) ICH BIN JETZT TAKTVOLL_0
(I am tactful now.)

Its truthvalue may change by its utterance, e.g. if it is

([14]) A first such reconciliation between the «logical» approach and the «ordinary» approach to the semantics of speech act expressions was attempted in my (1973).

([15]) This is true as long as the words of the sentence (8) get the standard interpretation. This shows that even for sentences of the most rigid kind there exists a context-dependency. E.g., if IST means «equal modulo 7,» (8) is true.

uttered loudly enough — during a solemn ceremony. Then, for the speaker, (10) might be true before the utterance and false afterwards. The concrete use of the sentence changes the situation.

Examples (8), (9) show that there is a difference between *absolute* sentences and sentences *related* to a context. (10) shows that there are two different ways sentences are related to contexts: either *abstractly* (the sentence is related to the context without being uttered or otherwise used in it) or *concretely* (the sentence is used itself in the context with which it is related). The same sentence can be used abstractly and concretely. ([16]) Sentences like (2), (2'), and

(11) ICH BEFEHLE DIR ZU KOCHEN$_o$
(I command you to cook.)

are then ambiguous as being used (a) as abstract commands (or as we may call them alternatively: ideal commands), ([17]) (b) as abstract *descriptions* of commands, (c) as concrete actions of uttering imperative sentences and moreover (d) as abstract *descriptions* of actions of uttering imperative sentences. This last sense (i.e. sense (d) of sentence (11)) is represented more adequately by the sentence

(12) ICH SAGE (ÄUSSERE): ICH BEFEHLE DIR ZU KOCHEN$_o$
(I say (utter): I command you to cook.)

used in the way (b), i.e. as an abstract description. Let us call (a) the ideal command use, (b) the abstract-description

([16]) This ambiguity can be blocked by marking sentences for their intended use: the punctuation (say) can be indexed accordingly: o_a (for abstract use), o_c (for concrete use). For a more systematic treatment see below.

([17]) This is a special kind of abstract use, because no utterance has to be made to perform the ideal action of commanding. Commanding is just commanding, nothing more! (This last sentence is *not* intended to be tautologous). Especially it is not (in the sense intended here) to utter a command sentence. To command in this abstract sense is meant as an action independent of uttering a sentence which has the action of command as its only immediate effect.

use, (c) the concrete-uttering, and (d) the abstract-uttering-description use.

B. Sentence (11) can be used also as referring to linguistic (e.g. sentences) and semilinguistic entities (e.g. utterances). Thus (11) is used itself as (e) (say) a sentence or (f) as designating a sentence. I shall not have much more to say about this group of uses, the autonymic uses, in this paper. This is the well-known use-mention ambiguity.

C. Sentences like (2), (2'), (11) exhibit a further ambiguity which stems from an ambiguity of «command». Let's discuss it for the ideal command use (i.e. the abstract use) of (11): (a1) the *action* of commanding may be *performed* (a2) a *state* of obligation may *hold* (German: gelten) and (a3) an *action of reminding* the state of obligation may be *performed.* The three senses (a1), (a2) and (a3) are illustrated by the following sentences (used as abstract description):

(13.1) ICH BEFEHLE DIR ZU KOCHEN$_0$ in *uttering* happily «KOCHE !» [Cook !»].)

(13.2) ICH BEFEHLE DIR ZU KOCHEN$_0$ (because I *uttered* happily «KOCHE !» and I did not yet withdraw what I said and you did not yet fulfill what I commanded. This situation arises e.g. if you asked me whether you should do such and such and I point out to you that I *still* order you to do what I commanded.)

(13.3) ICH BEFEHLE DIR ZU KOCHEN$_0$ (by uttering «ICH HABE DIR DOCH BEFOHLEN ZU KOCHEN» [«I did command you to cook, remember].) ([18])

The abstract-description use of (11) shows exactly the same ambiguities: (b1) the *action* of commanding may be *described,* (b2) a *state* of obligation may be *described,* and (b3) an *action of reminding* the state of obligation may be *described.*

The concrete-uttering use of (11) splits (at least) into two further uses: (b1) an action of uttering an imperative sentence

([18]) These ambiguities are perhaps more easily got by the similar sentence: DU SOLLST KOCHEN !

and (b3) an action of uttering an imperative sentence intended to be used for reminding. Similarly the abstract-description use of (11) splits into further uses.

D. This list of uses of sentences like (11) is by no means complete. Moreover there seems to be no obvious principle of structuring it. The best we can do is to search for one or a few distinguished uses which serve to express the other ones.

The abstract or ideal uses seem to fit well enough for this task. But the ideal-command use fits best. Because there are three possible uses of ideal commands — (a1), (a2) and (a3) — we have to select once more. (a1) and (a2) — i.e. the action of commanding and that a state of obligation holds — seem to be the most basic. So let us choose these two and study their possible connection later. It goes without saying that the distinction between these two modes of doing an action and of holding true of a state (that a state holds true) is a very basic one which applies much more generally. It is not restricted to commands. It can be applied to other modes of action and result.

Introducing some constants ([19]) we arrive at displaying (part of the full richness of ambiguities of (11):

(14)	(a)	ideal commands	:	Comm p
		(a1) action of commanding	:	Do-Comm p
		(a2) state of obligation	:	Hd-Comm p

([19]) [Comm], [Descr], [Utter], [Rem] for ICH BEFEHLE DIR, DASS (I command you), ICH BESCHREIBE, DASS (I describe), ICH ÄUSSERE (DIR GEGENÜBER), DASS (I utter [towards you]), ICH ERMAHNE DICH (I remind you) respectively. [Do-], [Hd-] are prefixes for [Comm], [Descr] and so forth. [St-] is a prefix for sentences. [Do-] and [Hd-] are used to distinguish between (the *doing* of) an action (like commanding, describing, and so forth) and (the *holding true* of) a state (state of obligation, description, and so forth). If the prefix [Do-] (or [Hd-]) is missing the expression should be regarded here as ambiguous between the two basic modes. [St-] serves to produce descriptions of the sentence embedded. «St-» is a quotation operator. Let [p] be a propositional variable.

(a3) action of reminding the state of obligation : Do-Rem Hd-Comm p

(b) abstract description : Descr Comm p

(b1) description of the action of commanding : Descr Do-Comm p

(b2) description of the state of obligation : Descr Hd-Comm p

(b3) description of the action of reminding the state of obligation : Descr Do-Rem Hd-Comm p

(c) concrete uttering : Utter St-(Comm p)

(c1) uttering a command sentence : Utter St-(Comm p)

(c3) uttering a sentence of the type: remind a command : Utter St-(Rem Comm p)

(d) description of concrete uttering : Descr Utter St-(Comm p)

(d1) description of uttering a command sentence : Descr Utter St-(Comm p)

(d3) description of uttering a sentence of the type: remind a command : Descr Utter St-(Rem Comm p)

This list should neither be regarded as complete nor as formally perfect. It is intended to demonstrate the complexity of the topic ([20]) we are about to study.

([20]) A similar display — as is (14) for the sentence (11) — must be made at least for sentences like the following in order to catch a flavor of the

It is, however, implicit in (14) and the foregoing underpinnings that we are forced to distinguish carefully between sentences, sentences related to a context and sentences uttered in a context. Furthermore we are forced to distinguish properly between commands performed and commands (obligations)holding true, between commands and imperative sentences, between commands and imperative sentences used, between declarative, interrogative and other sentences used as commands and imperative sentences used not as command (but say as illustration of a linguistic phenomenon), between obligations holding true and descriptions of states of obligation (hence between prescriptions and descriptions of prescriptions).

5. *Happiness and Success*

We must recognize especially that the use of sentences — especially of imperative sentences — in appropriate contexts for commanding raises typical problems of speech-act theoretical import. The use of the sentence in question may be un-

connection between abstract commands and linguistic realizations:
(*1) ICH HABE DIR BEFOHLEN ZU KOCHEN.
(I commanded you to cook.)
(*2) DU SOLLST KOCHEN !
(You should cook !)
(*3) KOCHE !
(Cook !)
and the impersonal sentences:
(*4) MAN SOLL KOCHEN !
(One should cook !)
(*5) ES WIRD BEFOHLEN ZU KOCHEN.
(It is commanded to cook.)
(*6) ES WURDE BEFOHLEN ZU KOCHEN.
(It was commanded to cook.)
and the third person sentences:
(*7) ER BEFIEHLT ZU KOCHEN.
(He commands to cook.)
(*8) ER HAT BEFOHLEN ZU KOCHEN.
(He commanded to cook.)

happy or if happy it may be unsuccessful. Rules ([21]) specify depending on the speech act performed necessary and sufficient conditions for happiness and securing uptake. Linguistic and non-linguistic conventions may interfere. The success of a speech act depends on imponderables.

To study our case let's abstract at first from sources of unhappiness and failure — that is our starting point. Each action should be fully appropriate to the circumstances — in other words happy — and successful.

6. *The Underlying Ontic Structure*

What parameters are to be taken into account if we are about to study commands? Because commands are special actions we prefer to ask this question first for actions done by agents. This topic is treated in the present section. The discussion of the full problem is delayed until the next section. In order to reduce the complexity of our problems once more let us study them at first for courses of events unaffected by agents.

A. Let us believe in a universe in which the past is closed and hence (at least in principle) fully determined, in which the future is open and (hence) not fully determined, and in which agents — if taken into account — can act only in the present. o speak about past, present and future commits us to a set of times T, an order relation Δ on this set and a distinguished element t: the present time.

Let us assume that there are propositions not involving any explicit reference to time (say by tense-operators or time-dependent relations) as for instance «The sun is green,» «The sky is clear.» Call them tenseless propositions. A «situs» is an entity for which every such proposition is either true or false. Let V be the set of situsses.

We may identify situsses with maximally consistent sets

([21]) SEARLE (1965) thinks them to be constitutive rules: The using of a sentence σ counts as something in context c.

of tenseless propositions. As time proceeds situsses may change. So let us define a «world» as a function which assigns to every time a situs. ([22]) Let I be the set of worlds. If we take into consideration that *individuals* may come into existence or may vanish the ontic structure is a bit more complicated. One starts then best with an arbitrary set of (finite) disjoint time intervals, an interval being the set T_k of times, $k \varepsilon N$, N, the natural numbers, and a set **A** of possible individuals. The elements of each interval are ordered by a relation Δ_k ([23]). A function A assigns to every interval-number k the set $A_k \varepsilon P(\mathbf{A})$ of individuals existing at every time t during that interval T_k. Every set of individuals A_k determines a set of possible situsses. ([24]) Call it V_k. A world segment is a function from an interval T_k into the corresponding set of situsses V_k. Now time intervals can be «glued» together to give a finite or infinite chain of time T. A world is then a function from any such chain of times T into corresponding situsses, i.e. if

([22]) We can, however — if we are to define a more comprehensive ontology — take worlds as entities for which every arbitrarily tensed proposition is either true or false. In other words we can choose worlds as being maximally consistent sets of arbitrarily tensed propositions.

This would give rise to some technical complexities. If we allow only for predicates — I speak somewhat loosely here — which have at least one free argument of time (which is interpreted as the predicate being true at that time) worlds still can be defined as functions from times to some values. These values, however, are then — in the general case — more complex than situsses. Only if the admissible predicates contain exactly one free occurrence of time and otherwise being independent of time the values are simple situsses.

([23]) Think of half open half closed intervals such that they can be «glued» together to a linear or partial order of times, consisting say of countably many intervals.

([24]) A set of individuals A_k determines the set $P(A_k)$, the powerselt, and $P(A_k x A_k)$, $P(A_k x A_k x A_k)$ and so on. Let $P = \bigcup_i P((A_k^i)$, where $A_k^i = \underbrace{A_k x \ldots x A_k}_{\text{i times}}$

This is the set of possible (extensional) relations. The situsses are the entities for which of each such relation and each appropriate number of individuals it is either true or it is false that the relation holds.

$t \varepsilon T_k$ the world assigns a situs $v \varepsilon V_k$. Let I be the set of (all possible) worlds. ([25])

A situs at a time $<v, t>$ is compatible with a great many of worlds, namely with all worlds for which the situs assigned at time t equals v. Thus a situs may be conceived also as a set of worlds for which the same tenseless propositions are true for a specific time t. For a world everything, past, present and future are determinate, for situsses only the present is.

To account for the intermediate case, where the past is determinate and the future is open, we use situations. A situation s_t is the set of worlds which at time t are compatible with the coming future and agree on the past. This set generally comprehends more than just one world. A situation comprises the past as fact and all the future possibilities. In a situation the future possibilities are abstractly indicated. Let S be the set of possible situations. If no agent interferes, there would be a distinguished world of those possible in the future of a certain time, which would get realized as the time proceeds infinitely. Call this world the *normal world* i. Observe that (normal) worlds are changing worlds in the sense that tenseless proposition true at one time need not be true forever. Thus a rather complex course of events will take place ([26]) «normally.»

([25]) What kind of set the set of *all* possible worlds is depends on the way they are constructed. We could require no further restrictions. But we could also demand that the intervals follow some order (e.g. an order on K), or more restrictively that individuals must cohere. No resurrections are then allowed. Or we may demand that relations must cohere in some sense to make it clear how they are to be identifieed at different times or in different worlds. A very special and somewhat uninteresting case is that where individuals come into existence and vanish in all the worlds at exactly the same times. Only then it would be possible to simply define worlds as function from a linearly ordered set of times into situsses. I.e. only then the somewhat clumsy time interval construction could be avoided.

([26]) There are other ways to define «normal» worlds. A most simple definition would be the world which keeps the *momentary situs* all the time. We could call this the rigid world of a situation. Another kind of normal world would be the *ideally expected* world. For instance, the world which

A *normal course* of events is then a sequence of situations which are in succession along the normal world. These situations become, as the time proceeds, more and more specified: the openness of the future is removed gradually.

B. Now we want to take into account actions of possibly more than one agent. Accordingly we are committed to a set of agents A. The next thing to do is to determine the course of events if the agents act. We have to be clear therefore about what we mean by «agents act.» To settle this question it is fruitful to distinguish two kinds of actions, call them *actions by label* and *actions by value*. To see what I mean by this distinction just imagine a big operation board of a computer which controls some process visible for an agent manipulating at this board. To do an action by label is to press a series of keys according to their label (or designation). The agent need not know the effect he is producing by pressing the key. It is a local intention — a local aim — plus the environment which controls the (overall) action. But an (overall) action is done ! To do an action by value is to press keys at random. The pressing of the keys is controlled (by feedback) by the outcome of the manipulations of the agent. In this case the agent need not know what keys he was pressing to reach the goal. It is the global intention — the global aim — which controls the (overall) action.

Another way to look at this distinction is to say that actions by label are *fully programmed* — but with respect to the result — *blind trials* and that actions by value are totally *unprogrammed* but *with perfect information* for the agent about the outcome.

Real actions are mixtures of these two extreme kinds of actions. They are partly programmed in performing them but the agents get also partial information about the outcome.

For the logic of action we are about to devise we take another idealization to start with : the sequentially pro-

is brought about by the normal (or standard) actions of the agents. A further kind of normal world would be the one which is generated by *rational* or in some sense *optimal* actions of the agents.

grammed *and* fully informative action. The agent has a possibly infinite sequence of operations (manipulations)by labels at his disposal. The total action is determined by the outcome which is intended by the agent to be brought about. The coming about of the intended result *terminates* the operations of the agent.

We are now ready to answer what it means that agents act, i.e. what it means that agents perform sequentially programmed and fully informative actions: *An action of an agent changes the normal course of events. This is done by changing the normal world i to another world i'.* ([27]) *This change is made according to the agent's intention* (*value*) *p.* This intention is only partial. I.e. an agent intending to tear a paper into pieces need not have intentions about his special movements to accomplish this aim, nor about his speed of breathing (say), nor about other things happening independently of him and his action. Thus his intention does not fix the new normal world absolutely and in every detail but only relative to his intention p, the present situation s_t, the prevailing normal world i, etc. There is a function ξ which assigns to each agent a, time t, intention p (which the agent carries out now at t), situation s_t and prevailing normal world i (condition: $i \varepsilon s_t$) the new normal world i' (condition: $i' \varepsilon s_t$) which is created by the agent by acting at time t in the situation s_t and normal world i carrying out his intention p. Call this function ξ intervention function. It determines the way in which the agent intervenes in the normal course of events, if he would intervene to fulfill his intention p.

Admittedly it would be rather nice to know something more about the general and some special traits of this function. First, the function as it stands is not fully general. It

([27]) We assume for the time being that the performing of the action does not consume any amount of time, which is of course an indealization. Thus the action of cutting an apple is just the momentary change of what the normal world and hence the normal course of events will be. It is just this minimal intervention which — in ideal cases no further control is needed to secure this aim — will have the cutting of the apple as a consequence.

must be generalized to the acting of more agents with corresponding intentions. This raises no special problems. We will occasionally come back to this later. Second, we have to take into consideration that an agent cannot bring about every normal course of events and not every normal world which is compatible with his present situation. There is a gradation between these worlds. Some are generated more easily, some are impossible for the agent to reach. It is plausible that worlds more similar to the prevailing normal world are produced more easily than more dissimilar ones. ([28])

Moreover it is conceivable that the bringing about of a very dissimilar normal world is facilitated by bringing about intermediate cases. Let R_a be a similarity relation between worlds with respect to the agent a. R_a obtains between i and i' iff i' is so similar to i that the agent a is able to generate i' from i by a basic operation. ([29]) From the foregoing it is plausible that R_a be reflexive but not transitive.

Third, it seems clear that agents are as lazy as possible. They normally do not change the world to a greater extent than necessary. Thus the intervention function assigns to an agent a, intention p, and prevailing normal world i the *next* world i' (with respect to iterations of basic operations determined by the similarity relation R_a) such that the intention p is fulfilled. Explicit reference to time t and situation s_t may be appropriate occasionality but need not be done for what has been said so far. This needs to be done for the next two requirements. Fourth, the change of the normal world is restricted by the present situation. Only new normal worlds

([28]) Similarity is perhaps the essential relation between worlds to structure the ability of bringing about a result. If a solution for a problem (intended result) is available then it counts normally as trivial to provide for a solution of a similar problem. However what is the way to solve a problem dissimilar to all known ones ? One possibility is in fact to find a way to look at the problem in a manner such that it reveals its similarity to a solved one. But how do we find such a reorientation ? We risk a circularity; proposal: trial and error. This is the way to cut the circularity somewhere.

([29]) Basic operations are roughly Danto (1965)'s basic actions.

compatible with the coming future and the happened past are possible. This condition emanates from the fact that actions can change neither (the situsses of the) past nor (of) the present. Fifth, the fact that actions take place *in the present* — but do not change the present situs — must be taken account of. By the condition above, we have seen that it is impossible to act in the past. The present situation determines uniquely the possible normal worlds on their past. They agree completely there. A condition must be imposed which excludes acting *in* the future. This is done by the requirement that an action must affect the normal world at *every* time *between* present t and future time point t' in question, if the normal world is changed at t' *by the action.* It is nonsensical — at least of what one commonly believes true about actions — that actions take place now but exhibit first effects only a while after. ([30]) A history or course of actions we call a sequence of situations along the prevailing normal worlds generated by the actions of the agents. Sixth, we defined an action to take place instantaneously. Because in a certain situation there is exactly one situs at a time, there cannot be a change of the situs as an instantaneous result of an action. What is changed, as we know, is the normal world. Changes of situsses are only future to the action. Thus a change of a situs only can be intended by the agent for some future time, for instance for the next possible future time. Thus an action — as seems intuitively correct — is to be conceived as a *trial* to reach a certain aim even in the ideal case where the normal course of event is foreseen completely by the agent: Another agent may render idle what the first agent intended to do. To simplify matters one could exclude however such cases of failures by more or less artificial restric-

([30]) Topologically it makes sense then to say that actions are done at the end of an underlying time interval — which we thought of as being open towards the past and closed towards the future. Not only changes of the existence of individuals, but also changes of the truth of propositions created by an action of an agent should occur at the beginning of an open interval.

tions. ([31]) What are the results brought about by an action? States which would not have occurred, if the action were not performed, are the results of the action. Not whole situsses can be regarded as results but only partial situsses — which we called propositions or which we will call hereafter states. Thus merely partial situsses, partial worlds, and partial courses of actions can be regarded as *results* of the actions of the agents and not the complete such entities. ([32])

7. *Commands and States of Obligations*

Actions in the sense we typically conceive them concern the real, down to earth material world and the present situation. There are other types of actions however. Commands — in which we are interested here — do not concern the real world directly. Agents commanding do not try to change the normal world directly. They try to get other people to change the normal world directly. ([33]) Moreover do commands not exclusively concern the present or immediate situations either. Commands refer commonly to the future or even to the past (ex post facto laws, rückwirkende Gesetze).

The problem we have to settle is what are agents changing who perform commands. As must be clear from the discussion in section 4 («A Series of Distinctions») that we are not interested here in the analysis of performing speech acts which have the force of a command, i.e. especially that we are not

([31]) For speech actions (!) in a discussion with two and more speakers the order of turns is normally strictly sequential. For a series of games such turn-taking rules determine a sequential order of acting too. This is, however, not so for more turbulent games such as soccer or football.

([32]) Sometimes it is distinguished between intended results and unintended results. If an agent tries to catch an apple from a tree and succeeds, he may damage the tree unintentionally. But an unsuccessful trial may have unintentional results without then having any intended results. Unintended results are often called consequences.

([33]) Let us discuss the possibility of issuing commands at one's own address another time.

interested here to know what the performance of such a speech act is changing. This is a problem which will presuppose at least a rough solution of what are agents changing who perform commands.

To settle this task let us roughly explicate first what a command in the strict sense and second what commands in a broader sense are. We do this by stating a series of conditions which should characterize roughly what a command in the strict sense is. These conditions are merely justified by a series of examples. A more thorough justification cannot be given here. Commands in a broader sense are then acts fulfilling some essential but not all conditions for strict commands. Examples of commands in the broader sense are demands, charges, orders, requirements, requests, desires. It is also possible to command — in a broader sense — oneself: good resolutions (German, gute Vorsätze), self-commitments and promises are cases in point.

For

(15) a's commanding b (in the strict sense) to do p.

it is neither necessary nor sufficient that

(16) a gets b to do p.

This is not necessary because it is perfectly possible not to follow commands. It is not sufficient because forcing someone to do something and hindering someone to do the contrary are not commands. The weaker condition

(17) a tries to get b to do p.

is necessary but not sufficient. The non-sufficiency is shown by the possibility to try to get somebody to do something by rewards or to prevent him from doing the contrary by menaces, which both are not commands.

For a's commanding b (in the strict sense) to do p it is neither a necessary nor a sufficient condition that

(18) a wants b to do p.

That this is not necessary is shown by an officer's commanding a soldier to bomb a certain town without really wanting him to do it but being obliged to command him to do it. Another more uncontroversial example is a's commanding b to do p not wanting p to be accomplished by b but demonstrat-

ing to b a's ability to command. ([34]) That (18) is not a sufficient condition is shown by an officer's wanting a soldier to sit down without making the soldier acquainted with his wish. The officer may want that soldier to do p, without undertaking anything to let the soldier know this. Better approximations to (15) — we just forget (17) for the moment — are:

(19) a lets b know that a wants b to do p.

(20) a makes b believe that a wants b to do p.

(21) a makes b believe that a and b mutually know ([35]) that a wants b to do p.

The last approximation looks the best. It is necessary but by no means sufficient. Otherwise, happily and successfully uttered, wishes, advice and so on were commands. To cut off this possibility we have to think of examples like (a) the schoolboy commands the master to recite a poem (impossible), (b) the schoolboy — after the bell has rung — commands the master to stop the lesson (possible), (c) the master commands the schoolboy to drink a glass of whiskey (impossible). Example (a) seems to show that there must be a hierarchic relation between commander and commanded. (b) shows that this is not the case, but that even people of hierarchically lower rank may command if they refer to an institutionally backed right to do so. ([36]) (c) strengthens this point by showing that a hierarchically higher position does not allow one to command what one wants. An institutional background seems to be essential however. Thus our next guess — including (17) now — for characterizing (15) is

([34]) Even if there is nothing a wants b to do — i.e. if all that b may do is equally preferred by a — a may command b to do something, as the case of a's demonstrating his ability to command shows! This is *not* commanding in the whole sense.

([35]) In the sense of Schiffer's (1972, p. 30) «a and b mutually know q,» i.e., «a knows q and b knows q and a knows that b knows q and b knows that a knows q and a knows that b knows that a knows q and ...»

([36]) The truth of this statement is problematic. There are people who deny that (b) and similar cases are possible. They rather think (b') the schoolboy - after the bell has rung — demands the master to stop the lesson. Then in fact a hierarchical order between commander and commanded has to be assumed in a characterizing condition for (15).

(22) a tries to get b to do p by making b believe that a and b mutually know that a wants — by referring to the institutionally warranted right that a is in a position to try to get b to do p — b to do p.

The institutionally warranted right referred to might include rights (to suggest) to reward b — by decorations — if b actually does p or (to suggest) to sanction b if he doesn't. There might be rights included (to suggest) to escalate sanctions if b is not doing p even after repeated demands to do it.

Thus commanding in the strict sense is to try to get somebody to do something by bringing him into a certain state of knowledge, ([37]) namely the state of knowledge that one is to want the other to do something, by referring certain rights. That somebody is wanted to do something (by reference certain rights) is called state of obligation. Thus commanding as it is analyzed in (22) is the action to try to get somebody to know that he is in a certain state of obligation (for «obligation» see also below). It might be questioned however that the basic notion of command is epistemic as would be the case according to (22).

Taking into account the remarks about the non-sufficiency of (18),

(23) a tries to get b to do p by wanting — with the help of reference to the institutionally warranted right that a is in a position to try to get b to do p — b to do p.

is not a sound characterization of (15). A command is also institutional in that it must become official. Thus probably

(24) a tries to get b to do p by making it official that a wants — by referring to the institutionally warranted right that a is in a position to try to get b to do p — b to do p.

([37]) This does not contradict the famous «unawareness does not prevent sanction» (Unkenntnis schützt vor Strafe nicht), because this maxim only means that everybody must be aiming to know even the newest laws. If there are however reasons that it was impossible for him to know them or that he was hindered from knowing them he cannot be punished.

According to whether or not one analyzes «official» epistemically, ([38]) commands are epistemical or not.

We are now ready to discuss what agents performing commands in the strict or the broader sense to change: *They change the status of officiality of a's desire that b does p.* An officially stated desire (together with the reference to the institutionally warranted right for making that desire official) is what is commonly called obligation. In this sense commands are introducing obligations.

8. *Objects of Desire and Obligation*

This is only a partial answer to the question what commands do change. Referring to the ontical elements (entities) introduced we must clarify what are the objects of obligation or more neutrally what are the objects of desire to know what commands do change.

Propositions

The possibilities we have to discuss are at least tenseless propositions, tenseless states, tenseless situsses, worlds, situations. To search for an answer we again study some sample cases. Acceptance or rejection as the appropriate objects of obligation hinges on the satisfiability ([39]) of the commands stated.

Propositions cannot be objects of obligation. If the captain commands the sailor to bring him a rope — the proposition in point is: The sailor brings the captain a rope — the captain would disapprove that the sailor delivers a rope not fulfilling

([38]) E.g. as probable mutual knowledge (epistemically) or as ontological state in his own right (non-epistemically).

([39]) This notion of satisfaction — somebody has acted according to certain obligations — is not to be confounded with Tarski's (1935) notion of satisfactions.

the purposes. Not just every rope will satisfy the obligation. Propositions are too coarse to serve as objects of obligations. ([40])

Situsses

Situsses on the other hand are too fine. If the captain commands the sailor to do something there are a lot of possible ways to satisfy the order. The sailor may fulfill it more slowly or more quickly, more directly or more indirectly and so on. The captain is not to specify the command completely. In the case of the sailor's bringing him the rope there are several ways the rope can be presented to the captain.

States

States, arbitrary sets of situsses, are in between propositions and situsses. They need not be linguistically expressed (nor being linguistically expressible) nor are they specified in all detail. In dependency of some contextual factors — such as who is the commander, who is the commanded, and so forth — a state (of obligation) could be assigned to every proposition commanded. Call these states which are commanded to be made true ideal states and call the situsses which are elements of an ideal state ideal situsses.

This very easy and nice treatment however won't do. The difficulty arises when we consider tensed commands. The captain may command the sailor to bring the rope tomorrow but not to bring it the day after tomorrow. He even may command today both at a time to bring the rope tomorrow and not to bring it the day after tomorrow. Thus the same tenseless state would be in a state of obligation and not a state of obligation.

([40]) In the military a common and at the same time safe way to sabotage is to execute obligations literally, i.e. to take propositions as objects of obligation.

This cannot be satisfied by any agent. Hence tenseless states are not the entities we are searching for.

Worlds

Worlds as we conceived them are tensed objects: functions from times to situsses. To circumvent the objections raised with situsses — that commands are not specified in all details — we try to say that objects of obligation are not worlds but sets of worlds. Now it is unreasonable to command somebody to do something if it is impossible for him to satisfy this command by some of his actions. In any case it is unreasonable ([41]) to command somebody to do something if this is not satisfiable in one of the possible futures. To account for this means that the objects of obligation are a subset of worlds of the present situation. Let us — for the time being — call these worlds ideal worlds.

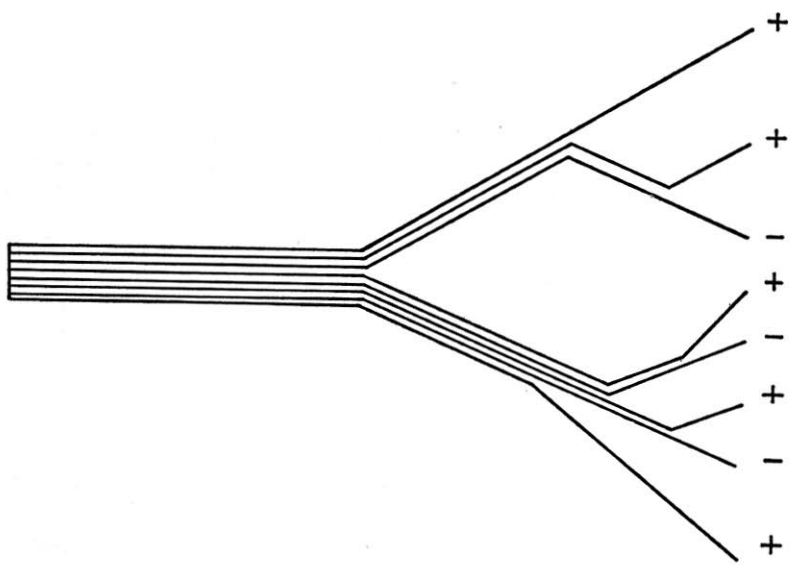
A little discussion is needed to explain the consequences of the present approach.

What do the ideal worlds signify ? How shall we employ them to make sense of our constructions ? The most straightforward use would be that the agent, willing to satisfy the obligations, tries to perform such actions which make the normal world as belonging to the set of ideal worlds. However evident this may seem, this is in the general case — and as we hope in the actual case — an impossible task. The normal world as we conceived it is the world which would be the case if nobody ever acts. That this world is an ideal one, one which should be realized, witnesses a sort of nihilism which I don't adhere to.

We could use them in another way. An agent, willing to satisfy the obligations, tries to perform such actions which make it possible for him to reach by future actions an ideal world. This view raises some interesting problems. First, look at a

([41]) if not irrational.

typical situation. The worlds of the situation are marked by + or — according to their being ideal or not.



An agent may act up to the last decision such that the normal world is always non-ideal. Such situations allow for a very bad life. The essential thing is to do the right thing at the end. Second — this is an issue of the first problem — what makes a world ideal or non-ideal ? What is — remember the way worlds are construed — the connection between the situsses occurring at certain times and the ideality of worlds ? Third, to make the second problem more precise, is it a reasonable proposal to say that a world is ideal iff there exists never a situs which violates an obligation ? If so, there remains nevertheless the problem that some worlds are non-ideal, because there is a nonideal situs in the near future, others because there is one in the remote future. In what non-satisfiability of the obligations concerns, the latter are much less essential for an agent willing to obey. Thus he may act with impunity to generate such worlds. Fourth, the crucial difference is between worlds where a non-ideal situs lies in the

past and those where some such situs may lie in the future. The first worlds should not be generated.

The last two points show that worlds and sets of worlds cannot be the entities of obligation. The (non-) ideality either says nothing that such a world is to be generated (or not) or the ideality is not invariably attributed to the world: if a non-ideal situs lies in the past the world is non-ideal, if not it is ideal.

Situations

Situations s_t were defined as entities taking into account a factual past and an open future. They are conceived as sets of worlds which agree on their past relative to t and are arbitrary in their future relative to t. To circumvent again the objections raised with situsses — that commands are not specified in all details — we propose that the objects of obligation are not situations but certain sets of situations. As we stated above — in the discussion whether sets of worlds could be taken as objects of obligation — it is unreasonable to command somebody to do something if this is not satisfiable in one of the possible futures. This imposes here the restriction that the objects of obligation could be only sets of situations possible in the future of the present situation. Let us call these ideal situations.

The consequences of this approach are the following.

What do the ideal situations signify ? How should we employ them to make sense out of our constructions ? The most straightforward use would be — similar to what we stated in an earlier case — that the agent, willing to satisfy the obligations, tries to perform such actions which make the normal world change such that the — at the moment present — situations are ideal ones. To make fully sense out of this approach it must be determined what it does mean for a situation to be ideal. What is, if we remember the way situations are construed, the connection between the worlds and the situsses they are construed of and the ideality of situations.

A sensible proposal would be to say that a situation s_t is ideal iff all worlds of the situation contain only ideal situsses in the past of t. Either no condition about the future is stated or it is required that there is at least one possible world which contains only ideal situsses in its future.

Because the worlds of a situation s_t agree on their past the condition amounts to the same as saying that a situation s_t is ideal iff one world of the situation contains only ideal situsses.

Now some problems arise. First if more than one possible agent exists a non-ideality of the world cannot be attributed to all of them. Hence if questions of guilt must be settled the causing of the non-ideal world must be taken into account. In more complex cases the non-ideality of a situation is caused by more than one agent. Such a notion of ideality is a very overall concept. To violate it means nothing more than that something went bad in the past. To introduce more susceptible notions of ideality one could (a) index ideality of situations by agents: a situation may be ideal for some agent but not the other (b) differentiate between kinds of idealities: the agent satisfied all obligations in the past, the actions of other agents do not prevent him to satisfy his obligations (i.e. a certain kind of danger is absent) and so forth.

Because of these problems let us discuss the second problem with a universe of exactly one agent. The second problem is the following. If the agent in question once brings about the non-ideal situation, his whole life henceforth will be non-ideal. This has some peculiar consequences.

(a) Because there are no future ideal situations in the case the agent once did not obey, there exists no regulative of his behavior whatsoever any more. All courses of action are equally good (or more appropriately in the case discussed: bad). (b) There is no possible future action of the agent for recovering or compensating what he forbore to do. (c) Either a peculiar kind of action operating on past (and possibly counterfactual past) situations has to be allowed for or excuses are not possible. An excuse of an unsatisfied obligation would have to change the ideality of a counterfactual past

situation to the idality of a past situation or at least to establish the ideality of a past situation. This can be seen from sentences expressing excuses like

(25) You would have had to do p but I let you off.
(reference on counterfactual past)

(26) I release you from what you really had to do.
(changing counterfactual past)

(27) I accept what you did, let it be done, it was not so bad.
(changing actual past)

From the study of such examples we are compelled to admit that it is not straightforward what the objects of desire and obligations are. For the tenseless case states fulfill probably many of the conditions which such objects have to match. For the tensed case a lot of problems seem to arise and further research is needed to find a totally satisfactory solution to the problem.

9. *Conclusion*

This study of the meaning and force of commands led us to a series of kinds of objects. We may assume that objects of intention, which are a generalization of objects of command to objects of other (speech) acts, exhibit some of the features of the objects of commands that we have discussed so far.

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