Jerzy Pelc

IF, THEN

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Translated by Klaudyna Michałowicz.

1. THE CONDITIONAL AND THE IMPLICATION

Interest in the conditional seems to have begun in the Megarian School. Diodorus defined it as IMPOSSIBLE to have a true antecedent and a false consequent, either now or in the past, whereas Philo of Megara (4^{th} c. B.C.) defined it as true, if and only if it is not the case that its antecedent is true and its consequent is false (Kotarbiński 1957: 50); this definition was accepted by the Stoics as well. These two models: the STRICT IMPLICATION and the MATERIAL IMPLICATION, were complemented with others in the same period. The definition that the consequent of a conditional is potentially enclosed in the antecedent, seems parallel to the first rather than the second of those definitions; Philo's conception of material implication is referenced by the observation that a conditional is fulfilled only when a negation of the consequent is incompatible with the antecedent. As it was usual at that time, at stake were sentences of a language of thought, *lingua mentalis*, which was composed of meanings, not words.

For a long time, Philo's position was the one accepted in logic by making use of the concepts of the material and FORMAL implication. They are present in, among others, the works of Frege (Frege 1879) and Peirce (1931–35: 3.441). Later, however, the former began to consider the conditional's divergences from the material implication model (Frege 1892). The latter held that a conditional, as a rule, was preceded by a general quantifier, whose scope varied depending on the context, e.g. for "each moment in time" or "for each potentiality." This may be viewed as the harbinger of the pragmatic concepts of *index* (in D. Scott's terminology: *point of reference*),

which were introduced by Richard Montague with the aim of analysing intensional expressions.

The debate concerning the concepts of material and strict implication has been unfolding since Antiquity, when the prototypes of those concepts appeared, and it is still ongoing today. In the perception of the majority of natural language users, the colloquial conditional, as a rule, does not yield to the veracity characterisation assumed for the material implication; this phenomenon is called the IMPLICATION PARADOX. An attempt to waive it is visible in, among others, the return to Diodorus' conception evident in C. I. Lewis' concept of strict implication (Lewis 1932), defined as *it is not possible that p and at the same time not q*, in the framework of his system of modal logic S_2, and also in Ackermann's approach to strict implication; in fact, Ackerman does not consider the so-called paradoxes of strict implication to be theses (Ackermann 1956).

The issue of the mutual relations between the concept of the conditional on the one hand, and the concepts of the material, formal and strict implications on the other hand, have been investigated in hundreds of essays and books, and specialist literature pertaining to this issue is still expanding (Harper, Stalnaker, Pearce 1981) and contains many pertinent observations.

First of all, it has been noted that in addition to the conditional *if p, then q*, the natural language contains also other formulas, which fulfil the same or similar semantic, or semantic and pragmatic functions.

This is done by, firstly, other conjunctions, for instance: *if, supposing, since, unless, provided, when, as soon as, seeing that, in consequence, as a result, on account*. In some languages, conditionals with a verb in the conditional mood have special conjunctions. We are all aware that in the English language the same conjunction: *if, then* appears in both types of the conditional. Interestingly, when a computer was told to make a selection of 325 examples of sentences with *if, then*, it turned out that 295 of them, that is to say 91%, were conditional sentences in the indicative mood (Cooper 1968: 296).

Secondly, instead of *if, then*, we find predicates, such as *implies*, *results in*, *follows, ensues, entails*), the difference being that these refer to sentences and hence they are combined with the names of sentences and not, like conjunctions, with sentences (Kotarbiński 1961; Łukasiewicz 1958).

Thirdly, the role of conditionals is fulfilled by such expressions or sentence equivalents as: *let's assume that p, in which case q*, *having assumed that p, we see that q*, *I must p, or else q*; *he will work well if encouraged*; *in case of rain, p*); *in the event of fire, p*); *in your position, p*) (Cooper 1968: 295;

Downing 1974: 86).

The possibility of paraphrasing the conditional *if p, then q* in so very many ways is associated with the diversity of meanings ascribed to the conjunction *if, then*, which has been noted by many authors (Belnap 1975: 164; Borkowski 1964: 11; Czerwiński 1958: 265–271; Downing 1974: 85–86; Ingarden 1972: 260, 272; Kotarbiński 1961: 168; Myhill 1975: 183; Ziembiński 1963: 85). Thus, the conditional *if p, then q* is uttered, among others, with a view to

(a) the CAUSAL CONNECTION, e.g. *If you eat too much carbohydrates, (then) you will get fat*; or
(b) the SIGN CONNECTION, e.g. *If he has a rash, (then) he has scarlet fever*, *If the flags are down at half mast, (then) the monarch has died*; or
(c) the THETIC CONNECTION, which emerges as a result of a decision or constitution, e.g. *If you are late for the bus, (then) take a taxi*; or
(d) special cases of the UNIVERSAL CONNECTION, to which refers the FORMAL IMPLICATION $\prod_x (f(x) \supset g(x))$, etc.

A precise enumeration of the meanings of *if, then*, and indirectly of the connections between the p and the q, i.e. between events or states of affairs to which refer, respectively, the subordinate conditional clause "p," i.e. the antecedent of the conditional, and the main clause "q," i.e. its consequent, is not what we have in mind here. It will suffice for us to realise that, considering the diversity of meanings ascribed to the conjunction *if, then*, it would be very surprising indeed if all conditionals without exception could be subsumed to the formula of the extensional material implication or, again all without exception, to the formula of the strict implication.

On the other hand, the noticeable diversity of meanings of *if, then* explains why so many discordant views on the semiotic, i.e. syntactic, semantic and pragmatic, qualities of the conditional are in evidence. For instance – to cite Ingarden (1972: 260, 272–278) – some see the conditional as a set of sentences, others as a single compound sentence. Some assume that it expresses a judgment in the psychological sense or a judgment in the logical sense; others argue that it does not express the act of judging but of, for instance, reasoning. According to some, it is a sentence which "states a connection" (with the meaning of these terms usually left unexplained) between two states of affairs mentioned in the antecedent and the consequent; others hold that it is a sentence that states a connection between sentences; still others say that it does not state a connection either between states of affairs or between sentences, but only states that which is mentioned in the

consequent, and even this not categorically, but conditionally.

Very few are adamant that there are no semiotic differences between the conditional in a natural language and the material implication. The fault line between the opinions runs elsewhere. Some argue that there are DIFFERENCES, yes, but only PRAGMATIC ones; others assert that those differences are BOTH SEMANTIC AND PRAGMATIC. The latter approach seems to be better justified.

Representative of the first approach is the view expressed by Ajdukiewicz in 1956 (1965: 248–265) that the conditional and the material implication STATE the same, i.e. that the state of affairs stated by the antecedent "p" and the state of affairs stated by the negation of the consequent, i.e. "$\sim q$," do not occur simultaneously. The difference between them lies only in the fact that the conditional EXPRESSES something else than the material implication; more precisely: the real conditional expresses the speaker's readiness to deduce q from p and his lack of knowledge as to the truth-value false of p and the truth of q. The justification of this view is based on the assumption that the colloquial *if, then* is equal to the statement *not p or q*, and of the argument that, for that alternative sentence to be true, it is enough for at least one of its components to be true.

The criticism of this approach is based on the assumption that if two sentences state the same thing, they have the same truth-value, and on pointing to such conditionals as

If Copernicus had a son, then he was not a father.

Being contradictory, they are false, while the respective material implication is true because it has a false antecedent and a true consequent. Thus, at least some conditionals, although bizarre and probably rarely encountered in colloquial speech, are subject to different truth conditions than the material implication (Czerwiński 1958: 265–271).

Over the course of the last fifty years, many scholars have warned against identifying the conditional and the material implication in terms of semantics.

For instance, Quine (1955: 16–18, 32–33) – having declared himself (correctly, in my opinion) against the conjunction *if, then* of the real conditional being identified with the conjunction of a conditional with a predicate in the conditional mood, which in English sounds identical: *if, then* – notes that the table of truth-values of the material implication does not fit a real conditional in which there is no content-related connection between

the compounding sentences or, in addition, the antecedent, or both the antecedent and the consequent, are blatantly false. Such a conditional seems to be not so much false but, as Quine puts it, nonsensical. The conditional agrees with the table of truth-values of the material implication only when the antecedent is true and the consequent is false. In other cases, the table determines truth-values of nonexistent sentences, i.e. conditionals which do not occur in colloquial speech at all. "Thus, only those conditionals are worth affirming which follow from some manner of relevance between antecedent and consequent, some manner of law, perhaps, connecting the matters which those two component statements describe," observes Quine (1955: 17). He also proposes (1955: 32–33) the option of considering *implies* as fulfilling the functions of, at the same time, a predicate connecting names and a conjunction connecting sentences as a way to obviate the difference between the material implication and other types of implication on the one hand, and the various types of conditional on the other hand. In this case, the relation of implication would serve to construct non-extensional units consisting of sentences alone – only sentences placed in quotation marks. This, however, would constitute an abuse of quotation marks. Hence, instead of this, Quine assumes (1960: 226) that a conditional with no quantifier which has a false antecedent is nether true nor false (G), as shown by the following table:

p	*q*	*if p, then q*
1	1	1
0	1	G
0	0	G
1	0	0

The extended table, proposed by Cooper (1968: 305, 316), is supposed to embrace the reasonings that contain an unreal conditional in those places where the entire column consists of Gs:

if p, then q		*q*		
		q_1	0	G
p	1	1	0	G
	0	G	G	G
	G	1	0	G

We may agree that not all conditionals are equally divergent from the formula of the material implication, just as not all are equally close to the

formula of the strict implication. Conditionals, in which we express our DECISIONS or constitute a SIGN CONNECTION: *If the weather is nice tomorrow, I will go for an excursion*; *If I do not cancel my trip with a telegram, I will arrive on Thursday evening* (Czerwiński 1958: 269–270), agree with the material implication insofar as they fulfill the condition $\sim(p \wedge \sim q)$ while not fulfilling the condition $\sim\Diamond\ (p \wedge \sim q)$; this is done by conditionals resulting from the substitution of constant values in the place of variables in a certain true formal implication: $\prod_x\ (f(x) \supset\ g(x))$.

Yet this conformity of the conditional with the material implication relies at most on the fact that the logical inference from *if p, then q* is $p \supset\ q$, but not the other way round. In addition, as noted by Strawson (1952: 82–90) and Mitchell (1962: 61–68), $p \supset\ q$ is logically non-contradictory to $p \supset\ \sim q$, whereas *if p, then q* is contradictory to *if p, then not q*. What is more, $\sim p \supset\ p$ is a non-contradictory formula, whereas *if not p, then p* is intrinsically contradictory (Mitchell 1962). Also, the transitiveness of the conditional and its being subject to contraposition are occasionally questioned, in contrast to the material and strict implication. Finally, it is pointed out (e.g. by Stalnaker, in Harper *et al.* 1981: 41–55) that the negation of a conditional which has a possible antecedent is equal to a conditional with the same antecedent and an opposing consequent. There is more: although [(*if p, then q*) *and* (*if q, then r*) *and p*], *therefore r* is a compulsory truth, not always [(*if p, then q*) *and* (*if q, then r*)], *therefore* [*if p, then r*], and this is in contrast to the material implication (Dale 1974: 92). It is well known that the logical result of a negation of an implication is its antecedent, whereas this does not apply to the real conditional. Neither does the real conditional apply to the tautology:

$$[(p \wedge q) \supset\ r] \supset\ [(p \supset\ r) \vee (q \supset\ r)],\ [(p \supset\ q) \vee (\sim p \supset\ \sim q)] \supset\ [q/\sim q]$$

and $[q \vee (p \supset\ \sim q)] \supset\ [q/\sim q]$ (Gazdar 1979: 83–84). Finally, when the implication is regarded as identical with the conditional, it is impossible to explain why the words *only if* are used in order to perform a conversion $p \supset\ q$ (McCawley 1974: 632–635). Hence it is possible to observe that when colloquial reasonings are formalised by replacing *if, then* with an implication together with conjunction, disjunction and negation, non-intuitive results are often obtained (Cooper 1968: 300). It is even suggested that in the cases when a conditional sentence is used as a formulation of a material implication or a logical result, the conjunction *if, then* appears in an untypical role. This sentence is not equivalent to, or possible to infer from, the physical impossibility of the fact that p and at the same time not q (Downing

1975: 85), which weakens the option of interpreting a conditional as a material implication. What is, therefore, sometimes assumed is the infinite hierarchy of the concepts of implication as the inferences of the consequent from the antecedent according to the rules distinct from the given type of implication (Myhill 1975: 183). Some scholars assume that every "it implies" or "entails", i.e., "it logically results" can be replaced with a appropriately chosen conditional sentence, but it is not always possible to do it the other way round (Belnap 1975: 164). We see that non-standard implications, i.e. not only the strict implication, but also the constructivist, intuitionist and other ones, are increasingly widely used in multiple-valued logic.

One of the main directions in the analyses of the conditional undertaken over the last fifteen years is the theory based on the SEMANTICS OF POSSIBLE WORLDS. For instance, in 1968 Stalnaker (Harper *et al.* 1981: 41–55), as his starting point taking Ramsey's (1950) test for the assessment of the possibility of accepting hypothetical assumptions, assumed that the conditional is true in the real world , if and only if, its consequent turns out to be true in some other possible world, delineated by the antecedent. This possible world must possess, among others, two characteristics: (a) the consequent is true in it, (b) it differs from the real world as little as possible (Stalnaker in: Harper *et al.* 1981: 87–104). The concept of the possible world naturally focusses the attention on the unreal conditionals, i.e., the conditionals which express impossible condition (Chisholm 1946; Goodman 1955; Rescher 1964). Stalnaker is correct in assuming that the formal characteristics of the conditional function, together with the set of facts, are not enough in order to determine the truth-value of such a conditional; the pragmatic approach is indispensable.

Obviously, the stance which Stalnaker is assuming is that conditionals require a different analysis than material implication (Stalnaker in: Harper *et al.* 1981: 193–210). In this, he differs from Grice (Grice 1975), who defends the concept of material implication as useful in the analysis of the conditional while trying to solve the well-known paradoxes of implication. Yet both scholars understand that to limit themselves to semantic solutions, without taking the pragmatic ones into consideration, would deny the chance of achieving satisfactory results in the analysis.

Stalnaker's reflections refer to conditionals which express possible or probable conditions as well, whereas D. Lewis (in: Harper *et al.* 1981: 57–85) limits himself to conditionals with verbs in the conditional mood, focussing above all on the conditional with the word might in the consequent. Like Stalnaker, Lewis accepts the conception of a distance between the possible

worlds. He arrives at different truth-conditions of the unreal conditional i.e., one expressing an improbable or impossible condition.

The concept of possible worlds directs the analysis of the conditional towards the examination of the issue of PROBABILITY, and especially the conditional belief (Stalnaker in: Harper *et al.* 1981: 97–128; Lewis, *ibid.*: 129–147). This is the second direction of the analysis. Lewis's investigations support Grice's view that material implication may be of use in the interpretation of the conditional in the indicative mode.

The third direction of the analysis of the concept of the conditional leads towards the DECISION THEORY (Gibbard, Harper in: Harper *et al.* 1981: 153–190).

The fourth area of investigation concerns reflections regarding the connections between the conditional in the conditional mode with the subjective ASSESSMENT OF OBJECTIVE CHANCE (Lewis, *ibid.*: 267–297) that considers the time factor (Frassen in: Harper *et al.* 1981: 323–340).

The analysis of the conditional is also aided by the investigation of the PRESUPPOSITIONS. For instance, it is assumed that the presuppositions of the conditional are presuppositions either as to the antecedent or as to the consequent, minus the presuppositions required by the consequent and logically resulting from the antecedent (Karttunen 1971 and 1973). Assuming those suppositions to be semantic, they could be interpreted as a hypothesis as to the relations between the truth-value of the entire conditional and the truth-values of its components. If, however, those presuppositions were pragmatic, they would be compatible with the truth-value approach to *if, then*. In this case, pragmatic presuppositions would rely on accepting that what is explicitly presupposed is, for the duration of the conversation, included into the scope of common assumptions shared by the speakers, and that it is the antecedent that contains such a presupposition (Stalnaker 1974: 210).

What intuitions can be found in the more recent and newer analyses of the concept of the conditional, undertaken from the standpoints of the semantics of possible worlds, the probability theory, the theory of decision or the theory of presupposition? In order to answer this, I shall refer, perversely, to Roman Ingarden's analyses published in Polish almost fifty years ago. This is because I think that the intuitions which lie at the foundation of that traditionalist approach are very similar to today's ones, and that, in addition, this approach has one serious advantage: the reflections refer almost exclusively to the concept of the so called real conditional, i.e., one expressing probable or possible conditions and not – as they often do today – mainly

to the unreal conditional, i.e., one with improbable or impossible conditions; and the doubts of whether these two types of conditional can be described by a single theory are, in my opinion, well grounded. In addition, in Ingarden's considerations the apparatus of formal logic or probability theory does not overshadow the conditional itself, and hence there are no doubts whether the main issue at stake is the conditional, or perhaps the improvement of the conception of possible worlds, the probability theory, the theory of decision or the theory of presupposition.

Ingarden is interested in the conditional "judgement" *If A is B, then C is D*, seeing it as a coherent whole and not as a couple of judgements or statements. The function of the word *if* in the antecedent is as follows:

(a) it lifts the function of stating from the word *is* in the antecedent;

(b) it sustains, but also modifies the function of stating fulfilled by *is*, and the way in which it characterises the corresponding state of affairs, i.e. not categorically. This state of affairs (P), which corresponds to the antecedent *A is B*, is dependent on the state of affairs (Q), which is defined by the consequent *C is D*: the case, in which P would occur without Q, is ruled out;

(c) *if* in the antecedent indicates that something more is going to come after the antecedent.

The *then* in the consequent, in turn, indicates that Q occurs as "resultant" in the face of the dependence of P, and in addition the *then* together with the preceding *if* modify the meaning of *is* in the consequent, so that it differs from the *is* occurring in an independent categorical judgement *A is B*, the difference being as follows:

(a) existentially, the *is* in the consequent characterises the state of affairs Q as an existential complement to the state of affairs P;

(b) with regard to stating, the *is* in the consequent, i.e. in the statement *C is D*, ascribes the entity B to the entity C not straightforwardly and unconditionally, but in reference to the possible and not the actual occurrence of the state of affairs P. A conditional judgment as a whole fulfils the function of stating; its components do not. It states decisively that the state of affairs P (whose actual occurrence it does not determine) is existentially not independent in reference to Q, so that Q occurs with the occurrence of P. A conditional judgement is true when it is not the case that the state of affair P "desires" existential independence or that it does "desire" dependence, but not in reference to the state of affairs Q. Thus, the judgement: *If New York is a port, then 5 is more than 3* is false, whereas *If 3 is more than 5, then the soul of Socrates is blue* is nonsensical, because it constitutes an existential

relativity of something which cannot occur (Ingarden 1972: 260–322).

2. THE CONDITIONAL VS. THE STATE OF AFFAIRS

Let us now consider to what state of affairs shall refer a given conditional used in such-and-such a way. It will be a gloss to the description of mainly the semantic aspect of conditionals.

We distinguish three types of states of affairs:

a) existing ones,

b) the conditionally non-existing ones, i.e. those which do not exist now, but used to exist once or will exist in the future;

c) absolutely non-existing ones, i.e. those which neither exist now nor existed in the past, and will never exist in the future.

We do not consider the expression: "a given conditional used in a given way refers to an absolutely non-existing state of affairs" to be tantamount to: "a given conditional is false." This is because the latter:

(i) according to some views, refers to the truth- conditions of the material implication;

(ii) according to some scholars, does not permit the relativisation of the conditional to such-and-such use;

(iii) is incompatible to the concept of a sentence referring to an absolutely non-existent state of affairs, i.e. in the cases when such a sentence as

Don Kichot hailed from La Mancha

is, from a certain point of view, considered to be true, whereas the sentence

Don Kichot hailed from Mexico

as false, or in the cases when the given conditional in a given use refers to an absolutely non-existing state of affairs, but we wish to qualify it as neither true nor false.

Trying to establish whether a given conditional as a whole refers, in a given use, to an existing state of affairs or an absolutely non-existing one, we must consider, separately, two issues:

(i) what is the truth-value of p and the truth- value of q as isolated simple sentences;

(ii) what is the character of the conditional connection which, in our opinion, occurs between the states of affairs P and Q, which correspond to, respectively, p and q.

In order to answer the second of the above questions, we usually attempt to determine three issues:

a) whether the conditional connection really occurs between P and Q in the given use of the conditional *if p, then q*, and if it does, then

b) whether it occurred in the past, or is occurring now, or will occur in the future, or whether this conditional connection is timeless;

c) what is the modality of this connection, i.e. whether in this case we are dealing with a condition which is real or unreal, actual or potential, possible or impossible, probable or improbable. Some of these modalities of the conditional connection are externalised in the grammatical moods of the conditional which, by the way, are different in the grammars of particular languages.

Let us now consider examples of the real conditional.

If John had free time yesterday, he was working in the garden.
If John has free time now, he is working in the garden.
If John has free time tomorrow, he will be working in the garden.

None of the above conditionals state whether John had, has or will have free time, or whether, respectively, he was, is or will be working in the garden. To what state of affairs does such conditional refer, then?

Let us begin with the conditional in the present tense. It refers to the following state of affairs: the conditional connection occurs between the fact that John has free time and the fact that he is working in the garden. The occurrence of this connection is an existing state of affairs every time that both the state of affairs referred to by the antecedent and the state of affairs referred to by the consequent exist at the given moment. In contrast, in the case of both p and q being false, or p being false and q being true, the connection is not severed, but at the given moment (the "now") the above-mentioned conditioning does not appear in any of them; in this sense, we might say that this conditional in the given use refers to a state of affairs which in the given circumstances is absolutely non-existing.

When p is true and q false, however, e.g. when John does have free time now, but he is not working in the garden, the conditional connection has been broken; this conditional therefore refers to an absolutely non-existing state of affairs, but in a different sense than above.

An example without the word *now* must be set apart as different from the above:

If John has free time, he works in the garden.

This sentence can be understood in two ways: that the condition under discussion always occurs or it happens sometimes.

In the first case, only when p is true and q is false the conditional as a whole refers to an absolutely non-existing state of affairs. On the other hand, when p and q are false, or when p is false and q true, it is impossible to state whether the entire conditional refers to an absolutely non-existing state of affairs or to a conditionally non-existing one.

In the second case, in turn, i.e. when the above conditional is interpreted as implicitly containing the addition "it is sometimes so," even if p is true and q is false, does not allow to determine whether the entire conditional refers to an absolutely non-existing state of affairs or to a conditionally non-existing one.

Real conditionals in the past or future tense in which p and q are true refer to a relatively non-existent state of affairs, and in all other cases – to an absolutely non-existing state of affairs. *Mutatis mutandis*, we may repeat here the observations made in reference to conditionals in the present tense with the addition of "it is sometimes so" or "it is always the case."

Let us consider a conditional in the probable mood.

If the train driver fainted and stopped pressing the pedal, the engine would automatically begin to slow down.

Every time p and q in such a conditional are true, and at the same time refer to an event concurrent with the moment at which this conditional is used, this conditional refers to an existing state of affairs. If both those events occurred in the past or both will occur in the future in reference to the moment in which this conditional is used, the entire conditional refers to a relatively non-existing state of affairs. In all the remaining combinations of the truth-values of the antecedent and the consequent this conditional refers to an absolutely non-existing state of affairs. This analysis, too, could be developed in a way analogous to the analysis of the real conditional in the present tense.

Finally, a few words about the unreal conditional, i.e., one with impossible, e.g.

If lead had smaller specific weight than wood, it would float on water.

If used correctly, e.g. when its antecedent is genuinely a false sentence, this type of conditional refers to an absolutely non-existing state of affairs.

On the other hand, a conditional in which the antecedent is false and the consequent is true, e.g.

If lead had smaller specific weight than wood, wood would float on water,

expresses an absolute assumption of an non-existing condition for a well-known fact that wood floats on water; it therefore refers to a absolutely non-existing state of affairs.

It is however possible to overlook those seemingly unreal conditionals in which the antecedent is false, e.g.

If wood had smaller specific weight than lead, it would float on water,

or

If wood had smaller specific weight than lead, lead would float on water.

These are, in reality, real conditionals incorrectly used in the form of unreal conditionals.

A pragmatic issue which emerges at this point is the acceptability of making use of a conditional in these circumstances.

3. THE CONDITIONAL VS. THE SPEAKER

The following gloss refers to the speakers' attitude towards the conditional. But not towards every sentence *if p, then q*. This is not only because a conditional may be expressed by making use of conjunctions other than *if, then*. On the other hand, it is possible to formulate various compound sentences containing the conjunction *if, then*, which are conditionals only from the formal point of view, e.g.

If she did not manage to sway him, then what could others do.

or

Who would get tickets to that concert if not him.

or

He lost very much, if not all, on that deal.

Sentences similar to the above are not taken under consideration here. Neither do we extend our analysis to elliptical sentences, such as

If I remember correctly, you used to keep a hamster

or

If I may advise you, don't go out with her.

even though what we intend to say also refers indirectly to the latter.

When are we ready to use a conditional, i.e. either formulate it or accept that the speaker had the right to apply it in the given situation?

First of all, we require the conditional to have a conditional connection occurring (at least in our view) between its antecedent and its consequent. Hence, we shall consider unacceptable a conditional in which such a connection cannot be found. This refers to even those conditionals which consist of sentences which we unreservedly admit to be true. Whereas we consider the sentence:

If 16 is divisible by 4 with no remainder, it is also divisible by 2

to be used correctly from the point of view of pragmatics and to be true, the sentence:

If 16 is divisible by 4 with no remainder, insufficient air pressure in car tyres causes them to wear down more quickly

we shall consider to be bizarre and unacceptable, even though we are certain that both its antecedent and its consequent are true.

The second reason for our refusal to consider the conditional as correctly used is our conviction that its antecedent is false. Knowing that 12 is not divisible by 8 with no remainder, we do not feel at liberty to state the following conditional:

If 12 is divisible by 4 with no remainder, it is also divisible by 2

even though we notice the veracity of the consequent and we agree that there occurs a connection between the content of its antecedent and its consequent, even though this connection is not at all easy to define.

The supposition to make here is that the factor which prevents us from accepting the above conditional is the feeling that – in the face of the falsity of the antecedent, which we realise – in our view there is no conditional connection between that antecedent and the consequent. The content connection (both sentences concern the divisibility of numbers) and the subject connection (divisibility by 2, generally dependent on the divisibility by 8) are not accompanied by a conditional connection, or rather they are not accompanied by our feeling that a conditional connection was, or could be, realised. And perhaps it is this perception that the condition is impossible to realise prevents us from accepting the above conditional as allowable.

In the above case, what is at stake is not that the antecedent is false, but that WE ARE CONVINCED AS TO ITS FALSITY. It is well known, after all, that we often express our *nihil obstat* in reference to conditionals which genuinely have a false antecedent, only we do not realise that fact.

For example, the majority of philosophy students would not object to the sentence:

If Susanne K. Langer translated Cassirer's "An Essay on Man," she knew German,.

thinking (mistakenly) that Susanne K. Langer translated that book from German and (correctly) that the fact that she knew German can be inferred from the fact she made a translation from that language. By the way, Susanne K. Langer translated from German another book by Cassirer, i.e. *Language and Myth*, whereas *An Essay on Man* had been written in English in the first place.

What, in turn, is the impact of our belief that the conditional's consequent is false, with the concurrent lack of belief that its antecedent is false, on the assessment of the pragmatic allowableness of that conditional?

Let us imagine that someone is formulating a sentence:

If this light bulb is adapted to lower voltage than the present one, it blew out,

at the same time seeing, or at least believing, that this light bulb has remained intact. This kind of language behaviour is considered an infringement of the pragmatic norm. We assume that since the speaker has qualified the consequent as false, it ought to be concluded that he had been working as to the kind of the conditional connection, and refrain from uttering the conditional altogether, or, on the basis of the *modus tollendo tollens* principle, he ought to have guessed that the antecedent was false as well, and hence should have formulated an unreal conditional.

What is, therefore, our attitude to a conditional in which the components are, in our view, related to one another content-wise, but in our opinion they are false? The answer depends on the type of conditional. An unreal one we shall accept without reservations; the application of a real conditional in those circumstances we shall qualify as an infringement of a certain pragmatic norm.

The above refers to, respectively, these two sentences:

If a whale were a fish, it would breathe through the gills.

and

If a whale is a fish, it breathes through the gills.

Not only our conviction that the components of the conditional are false prevents us from considering it to be used correctly. The same happens when, while looking for a content connection and the conditional connection between the antecedent and the consequent, we are concurrently subjectively certain that both those sentences are true, e.g.:

If Warsaw lies in Poland, it lies in Central Europe.

We are generally more ready to consider that the following statements are more natural:

Since Warsaw lies in Poland, it lies in Central Europe.

or

Warsaw lies in Poland, and hence in Central Europe.

The fact that we prefer them to the conditional is an indicator that in a normal communicative situation we expect the conditional to provide us with some information, concerning, among others, the decrease of uncertainly as to the trueness of its components, especially the trueness of its consequent.

The conditional

If Warsaw lies in Poland, it lies in Central Europe

does not fulfil this function owing to our knowledge: after all, we are perfectly aware of Warsaw's location anyway. From this point of view, therefore, this conditional is used incorrectly in the sense that it is simply unnecessary.

But the same conditional may appear in a different role, for instance as a premise in a reasoning, for which the second premise is the sentence:

Warsaw lies in Poland,

and the third premise

Central Europe belongs to the circle of the Graeco-Roman culture.

Premises are sentences about whose trueness we are subjectively convinced. Hence the fact that in the conditional

If Warsaw lies in Poland, it lies in Central Europe.

used in this manner both the antecedent and the consequent are sentences in whose truth we believe does not undermine the correctness of using this conditional; in this case this conditional is, in fact, indispensable.

It seems that the analysis of a conditional, in which the antecedent is, in our opinion, a true sentence, but concurrently we are not convinced that the consequent is true, could proceed in the same direction.

We shall consider using such a conditional as to be pragmatically justified and correct when it constitutes an expression of an enthymematic reasoning according to the *modus ponens* scheme, as in the sentence:

If 1984 was a leap year, the consumption of electricity was larger in February of 1984 than in February of 1983.

If 1984 was a leap year assumes a dual role: (a) of a conditional clause, which constitutes a part of one of the premises, i.e. of the sentence:

If 1984 was a leap year, the consumption of electricity in February was larger than in non-leap year.

and concurrently (b) without the conjunction *if*, as the second premise,

The year 1984 was a leap year.

In these circumstances, the speaker's conviction as to the truth of the sentence

The year 1984 was a leap year,

i.e. the antecedent of the conditional, is requisite. At the most, it could be assumed that the sentence:

The consumption of electricity was larger in February of 1984 than in February of 1983, since 1984 was a leap year

would be more appropriate in these circumstances than the conditional.

When, however, the above conditional is not elliptical and does not serve as the expression of an enthymematic reasoning of this kind, the speaker's belief in the trueness of the antecedent lowers the pragmatic correctness of making use of that sentence.

Let us, in turn, look at a conditional in which our belief concerns the truth of the consequent and is not accompanied by our being convinced that the antecedent is true. For instance, a conditional referring to a person who received a state award

If he deserved it, he received a state award.

may be interpreted as one or the other:

(a) formulation of the component of the information in accordance with the second law of *reductio ad absurdum*, $q \equiv [(p \supset q) \wedge (\sim p \supset q)]$, i.e. the sentence:

If he deserved it, he got the state award, and if he did not deserve it, he also got the state award, and the other way round,

(b) or the non-elliptical conditional. In the first of the above cases, making use of the cited sentence seems appropriate from the pragmatic point of view, in the second its appropriateness is questionable.

The above observations are fragmentary, because they refer only to the real conditional in the Polish language, and omit the unreal and possible conditionals. Neither do they take under consideration the differences that can be noted when conditionals expressed in diverse ethnic languages are compared. Moreover, they do not contain an analysis of the allowability or pragmatic correctness of the use of a conditional by a speaker as contrasted with the qualification of the conditional by the recipient.

All this requires a separate, comprehensive and perceptive analysis.

The above observations are also sketchy. As it has already been mentioned, they constitute a small gloss to the investigation of the conditional and material implication. Another gloss of this kind is found in my book *Wstęp do semiotyki* (*Introduction to Semiotics*, Pelc 1984: 267–280). Both then and now, my reflections on the subject of the conditional deviate from what Kazimierz Ajdukiewicz (1965: 248–265) wrote about it, but at the same time they refer to his observations regarding pragmatic aspects of using the conditional (which he expressed only in a footnote). They refer to his observations, but do not repeat them, as I attempted to develop some of them and modify others.

The sketch and fragmentary character of the current essay does not permit me to formulate the conclusions with due responsibility. The intentionally exaggerated sentences that would signal some issues and invite reflection on them would perhaps be more appropriate here. They are as follows:

Whereas in the case of implication what matters is its semantic side, in the case of the conditional it is the pragmatic side. — Do not ask whether a conditional is true or whether it consists of true or false sentences. From the standpoint of the admissibility of using the conditional, a different thing matters: whether its user considers the antecedent and the consequent to be true or false. — The content-related connection between the antecedent and the consequent has its equivalent in the subject connection between those events or states of affairs to which, respectively, the antecedent and the consequent of the conditional refer. — The conditional connection is a type of the subject connection; the conditional connection between events or states of affairs must be distinguished from the identically termed conditional connection between the antecedent and the consequent. — Neither

the existence of the subject connection, nor, in particular, the existence of the conditional connection between the events or states of affairs is not indispensable in order for the conditional to be pragmatically allowable in the given conditions. — On the other hand, it is indispensable for the user of the conditional to perceive the existence of the subject connection and of a conditional connection between the antecedent and the consequent (for instance on the basis of his belief in the existence of a subject connection), and especially to perceive the existence of the conditional connection between the respective events or states of affairs. — The pragmatic admissibility of making use of a given conditional depends, among others, on the end to which the conditional was used in the given case, and especially on whether it constitutes a component of the reasoning or appears in an extra-inferential situation. In the extra-inferential situation, bearing in mind the pragmatic admissibility of using the real conditional, we require its user (a) to perceive the existence of a conditional connection between its antecedent and its consequent, (b) to not be convinced of the falsity nor certain of the truth of either of these components. In the case of the unreal conditional, we require its user (a) to be convinced of the falsity of the antecedent and the consequent, (b) to perceive the existence of a conditional connection between the negation of the antecedent and the negation of the consequent. — In the assessment of the pragmatic admissibility of a conditional, it is also essential to take into consideration its user's convictions as to the modality, especially as to possibility and impossibility, conditional connection, of the antecedent and consequent. — Convictions of the sender of a conditional regarding the existence of the conditional connection, the logical value of the conditional's components, and the modality of all these elements, may differ from the respective convictions of its recipient. — If an analysis of the pragmatic aspects of the conditional is to be correct, it requires that the points of view of both the sender and the recipient be taken into consideration.

Warsaw, November – December 1983 and May 1984

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