"DECISION TREES"

*by Peter L. Strauss and Michael R. Topping**

The object of this paper is to inform those concerned with the administration of justice in Ethiopia — particularly, criminal justice — about a new and simple procedure which may assist in procuring uniform interpretation and application of laws and regulations. The problem of uniform interpretation and application is particularly severe where, as in Ethiopia, new laws must be interpreted and applied by persons who have not yet had the opportunity of formal legal education. For these persons the discovery of the relevant code articles and the understanding of their interrelationships and application must be very difficult indeed. One possible result of this unfortunate state of affairs is that the codes will not be fully, effectively, or consistently applied throughout the Empire. If, on the other hand, administrators try to avoid this problem by assigning the Empire's comparatively few legally trained persons to such jobs as public prosecutor, woreda court judge, etc., then the result may be waste of legal resources. No one of these jobs is, in national perspective, of the very greatest importance; overall inefficiency of performance in them, on the other hand, can markedly reduce the quality of Ethiopian justice.

The most efficient use of Ethiopia's limited legal resources might be promoted by a scheme which enabled the central administration in Addis Ababa to send provincial centers of law enforcement programmed instruction, which would enable even persons who have not had formal legal training to proceed, step by step, through the solution of a legal problem to its proper conclusion. This paper is concerned with one such form of programmed instruction, which involves the construction of what have been designated variously as "algorithms," "flow charts," "logical trees," or "decision trees."** The last term, "decision tree," will be used here, since it best expresses the purpose of the procedure: to assist local administrators to reach uniform and correct decisions in applying national law. For reasons of convenience, this article will discuss "decision trees" only as they might apply in penal law. It will be apparent, however, that the procedure could as easily find application in any area of codified law.

If we take almost any article of the Penal Code, we shall observe that for it to be applicable, a number of conditions have to be satisfied. Let us take as an example, Article 589(1), which defines the principal offence of rape. Before that offence is constituted, there must be:

(a) an accused who has
(b) compelled
(c) a woman

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** A clear and comprehensive account of the nature and uses of decision trees is to be found in B.N. Lewis, I.S. Horogin & C.P. Gane, *Flow Charts, Logical Trees and Algorithms*, London HMSO, 1967, to which the present writers are indebted.

(d) to submit to sexual intercourse
(e) outside wedlock by
either (f) violence
or (g) grave intimidation
or (h) after having rendered her unconscious
or (i) incapable of resistance.

Unless each of conditions (a), (b) (c) (d) and (e), and, at least, one of conditions (f), (g), (h) or (i) are satisfied in any given case, the offence of rape has not been committed.

A check list such as this, indicating the necessary pre-conditions for application, could be prepared for almost any code provision. In this form, however, it might not seem to serve any useful purpose. It appears to be little more than a cumbersome way of restating the article itself.

One of the contributions of the decision tree becomes apparent if the check list is put in question form:

1. (a) Did the suspect use violence on a person?
   (b) Did the suspect use grave intimidation on a person?
   (c) Did the suspect render a person unconscious?
   (d) Did the suspect render a person incapable of resistance?
2. Was that person a woman?
3. Did he thus compel that woman to submit to sexual intercourse?
4. Was that act of sexual intercourse between persons who were not then husband and wife?

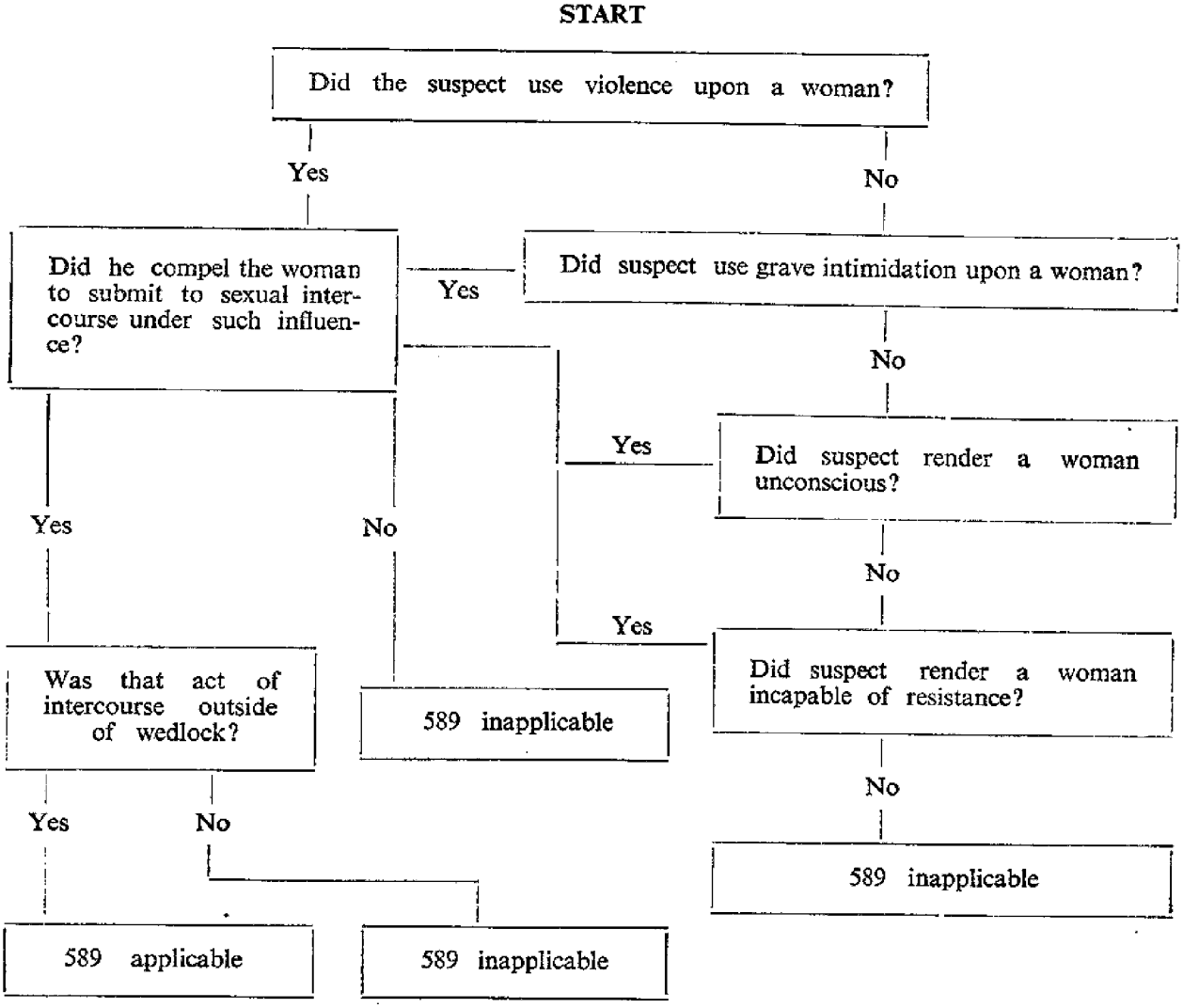
and if a mandatory instruction is added:

The suspect may be convicted of rape only if the answer to each of questions 2, 3 and 4 and to at least one of questions 1(a), 1(b), 1(c) or 1(d) is "yes." The form serves to emphasize the separate elements which must be present to constitute the offence, by requiring the local administrator to answer relevant questions and instructing him to proceed only if certain answers to those questions are obtained. He is thus forced to analyze the evidence in the appropriate way, and taken, step by step, through a decision process which he might not have correctly understood by himself.

The decision tree itself embodies the same technique of breaking legal provisions down into their constituent elements, and then presenting each element in the form of a simple question. It goes further, and puts these questions in logical order and diagrammatic form. This has the advantage, as we shall see later in dealing with more complex "decision trees," of simplifying the mandatory instruction. For the user, it has the great advantage of being a visual as well as a verbal process, and of never requiring him to do more than answer "yes" or "no" to a simple question. The only constraint is that having answered one question, he must proceed to the question diagrammatically indicated by that answer, and so on to a stated result, which he must accept as correct. The procdeure automatically directs him to the appropriate questions and the correct outcome. In the words of Messrs. Lewis, Horogin and Gane the user "is like a computer working through a program. In both cases the process is automatic, and provided there are no ambiguities of instruction, a successful outcome is guaranteed."

The simplest way of explaining the nature and use of decision trees is by examples. Let us therefore, first of all try to put the requirements for the commission of the offence of rape, as defined by Article Penal Code 589, in "decision tree "form.

Fig. 1



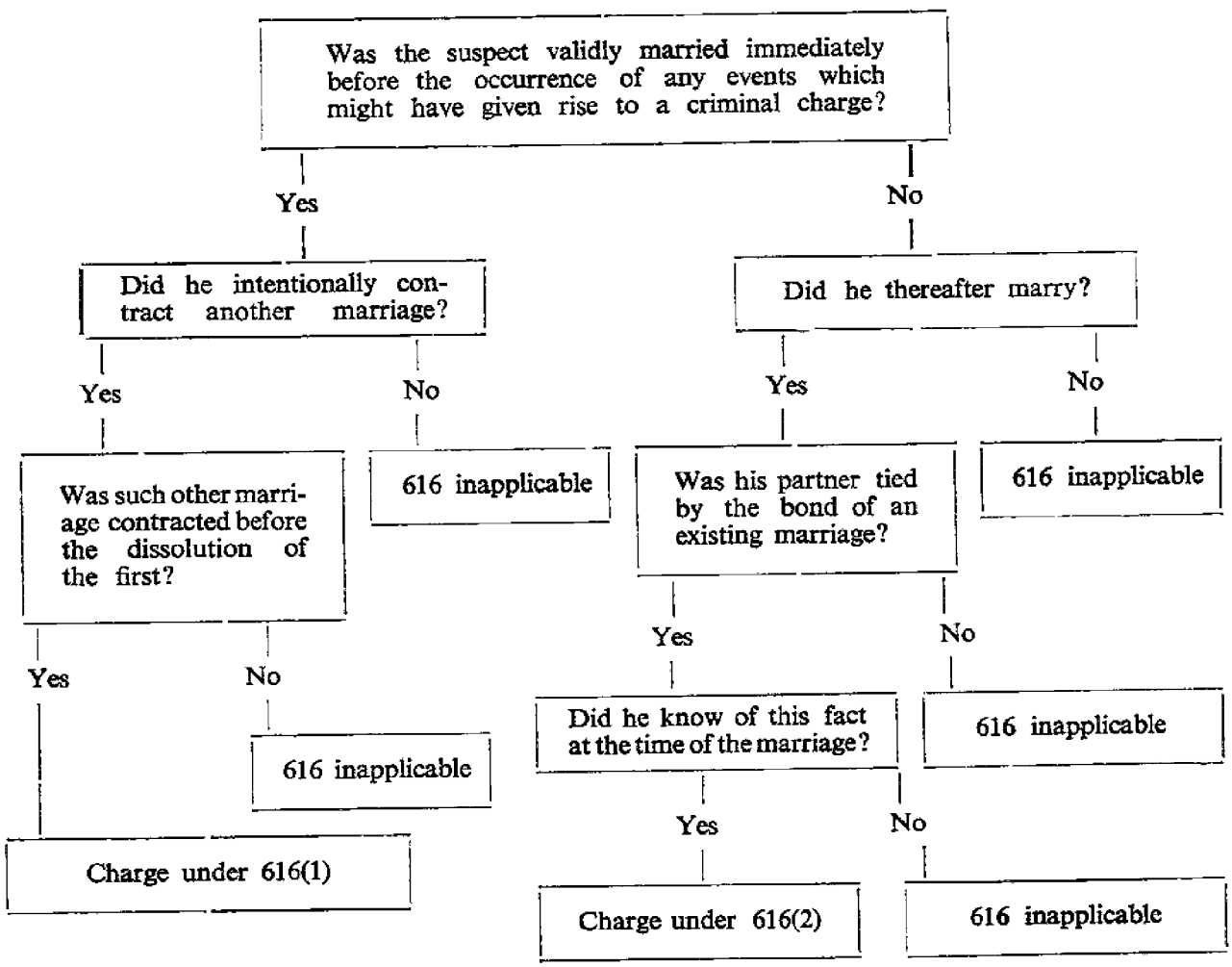
This diagram is, it is hoped, self-explanatory. Like the words of Article 589 themselves, it serves to define the offence of rape by setting forth the pre-requisites of the offence. By stating these pre-requisites separately, and in question form, it performs the significant added function of predigesting the article —stressing what is important and forcing the administrator's attention, in logical order, to the conclusions he must reach in order to justify conviction. The administrator is no longer completely free to overlook or to misunderstand one of the constituent elements of the offence.

The diagram assumes, however, that the administrator has already decided, by some other means, that "rape" is in fact the crime he is interested in. An additional, and greater, use of decision trees is to assist in the making of this kind of decision: to help the administrator decide which of several provisions before him is relevant to a case at hand. Decision trees which perform this finding function have been called "homing decision trees." A very simple example of such a tree, one step more complex than our tree for Article 589(1), can be constructed with reference to the crime of bigamy. This is a crime which can be committed in either one of two fact situations. Under Article 616(1), bigamy is committed by the already married person who intentionally contracts another marriage before dissolu-

tion of the first; under Article 616(2), bigamy is committed by an unmarried person who marries another whom he knows to be tied by the bond of an existing marriage.

The following decision tree would enable us to determine whether in any given case Article 616 is applicable, and, if it is, whether a charge should be preferred under Article 616(1) or Art. 616(2).

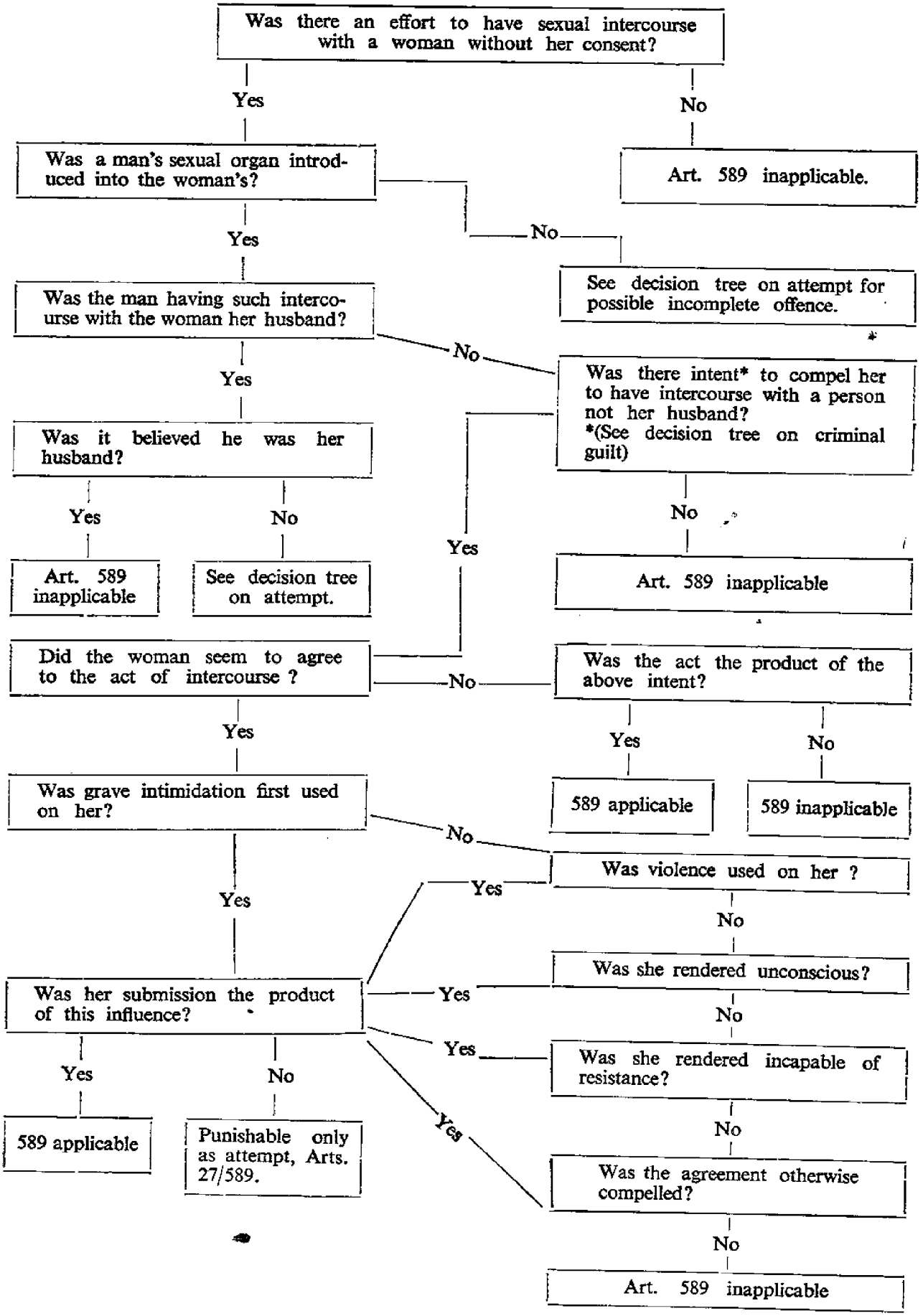
Fig. 2



This, again, is a very simple model, but it does help us to see how a properly constructed decision tree can be utilized to select the appropriate code provision.

In the two simple decision trees produced above, no effort has been made to show the relationships which every Special Part article has to articles of the General Part. In consequence, the mere use of these decision trees would not (any more than simple reference to Article 589 or Article 616) enable the user to decide upon the disposition of the case. For example, the accused might plead a mistake of fact, (Article 76) — in a rape case, that he thought the woman was his wife; in a bigamy case, that he believed a previous marriage was no longer valid. Questions of attempt, guilt, causality, responsibility, and the like may often arise in ways which would not always be obvious to the untrained person faced with the neces-

Fig. 3


Was there an effort to have sexual intercourse with a woman without her consent?
Yes
No
Art. 589 inapplicable.
Was a man's sexual organ introduced into the woman's?
Yes
No
See decision tree on attempt for possible incomplete offence.
Was the man having such intercourse with the woman her husband?
Yes
No
Was there intent* to compel her to have intercourse with a person not her husband?
*(See decision tree on criminal guilt)
Was it believed he was her husband?
Yes
No
Art. 589 inapplicable
See decision tree on attempt.
Yes
No
Art. 589 inapplicable
Did the woman seem to agree to the act of intercourse ?
Yes
No
Was the act the product of the above intent?
Yes
No
Was grave intimidation first used on her?
589 applicable
589 inapplicable
Yes
No
Was violence used on her ?
Yes
No
Was she rendered unconscious?
Was her submission the product of this influence?
Yes
No
Yes
Was she rendered incapable of resistance?
Yes
No
No
Yes
Was the agreement otherwise compelled?
589 applicable
Punishable only as attempt, Arts. 27/589.
No
Art. 589 inapplicable

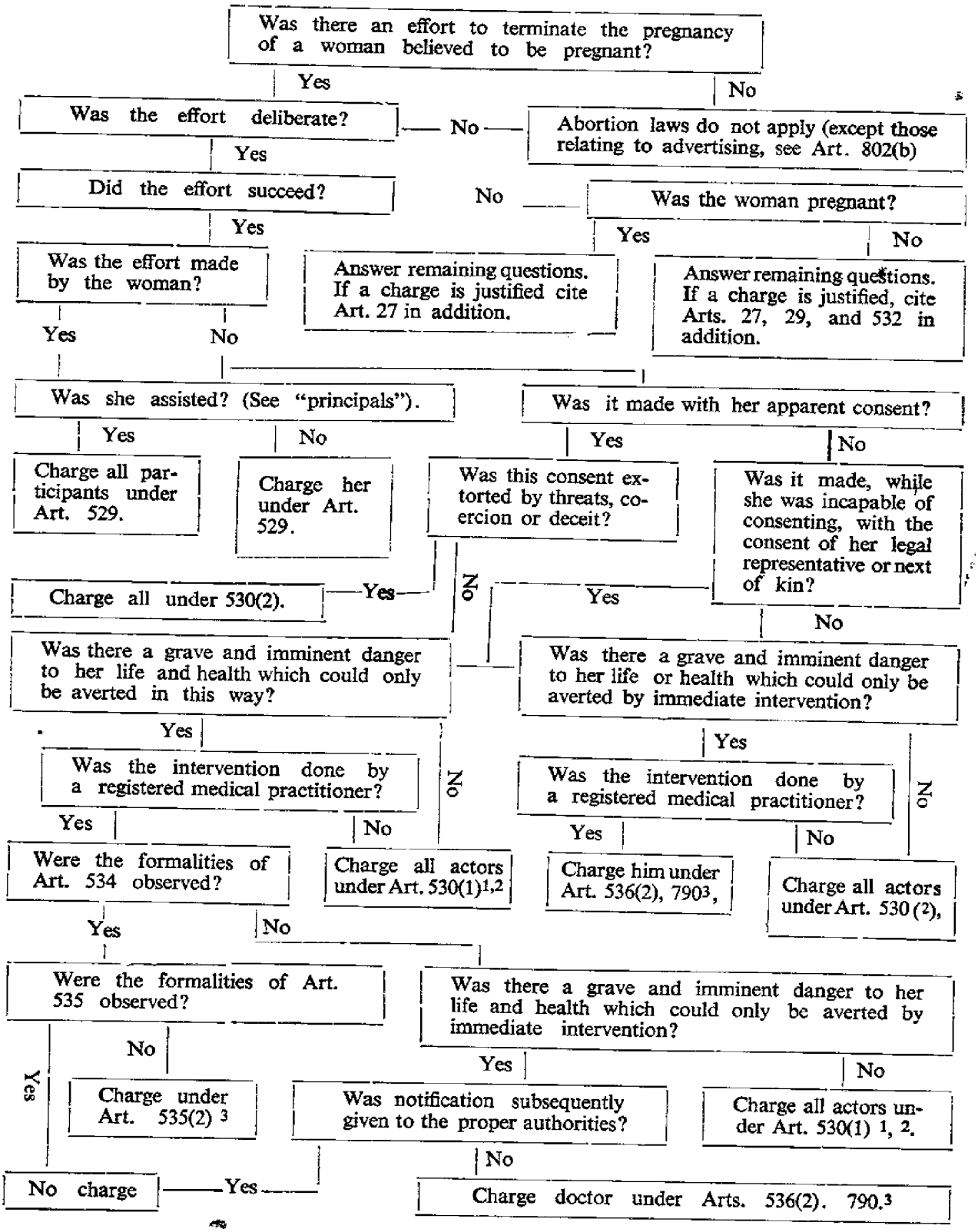
sity to understand or administer the codes. It would be inefficient to deal with these general questions, which could arise under almost any provision of the Special Part, in each decision tree that was constructed with respect to a particular offence; these questions may deserve separate, generalized trees of their own. But it may promote efficiency in applying the Code to indicate in decision trees for specific offences how, at least, the most common of these general questions might arise. Thus, our decision tree on rape might be revised to accomplish this in the manner shown by Fig. 3 above.

We are now in a position to take more complex examples, which go farther towards showing the interrelationships of a group of legal provisions. Too much complexity in a single tree, however, might threaten to deprive the tree of its value as a simplifier of the law. Moreover, enough has been said about decision trees to realize that they may have several uses. The prosecutor will want to know how to coordinate provisions of the Special part to which he might refer in formulating his charge. He may also find it valuable to have reference to General Part provisions which could modify the charge or affect proof requirements at trial. He may not, on the other hand, be overly interested in possible defences, or in learning of the circumstances which could authorize a judge to increase or decrease a sentence. Thus, for his purposes, only some of the many interrelationships need be shown. Similarly, for the judge, less emphasis on possibilities for charge and more emphasis on possibilities for disposition may be appropriate. A separate, educational function may be served by decision trees which reveal the interrelationships of commonly used sections of the General Part.

The three decision trees which follow are intended as examples of each of these types. The first emphasizes the "homing tree" approach which may help prosecutors to find the appropriate charge among several interrelated provisions. It is principally based on the nine articles of Book V, Title I, Chapter 1, Section II of the Special Part, dealing with abortion. The second is derived from this tree, but stresses sentencing information. The third, dealing with General Part problems, might help answer the question whether an incomplete offence has been perpetrated.

The reader will by now have been led to an obvious question: how does one draft a decision-tree? There is – at any rate for the lawyer – no answer. To quote Messrs. Lewis, Horogin, and Gane once more, constructing a decision tree "is a valuable exercise in clear thinking. This is so because the compiler must penetrate an often dense and tortuous style in order to determine that which will exactly embody the rules governing the decision making process." A logical basis for a decision tree is of course essential, but it is not (for the lawyer) enough: a certain intuitive element is involved. In compiling our decision tree relating to abortion, we might have felt it necessary to cover the situation of an abortion procured during an election meeting: we might have felt it necessary to deal with the hypothesis that the abortion was performed in Khartoum .. and so forth. The situation seemed too remote from the normal and therefore a selective process was applied. The size of any particular tree must be limited. The drafting of decision trees is an art as well as a science. There is no reason, in theory, why we could not construct a tree which covered the whole area of penal law, including procedure, a tree which would tell us whether any, and if so, which offence or offences had been committed, what charge or charges should be preferred, how the subsequent trial proceedings should be conducted, what modes of disposition were open to the court in the event of a conviction, and by what considerations the court should be guided in its ultimate disposition. There are, however, no office walls large enough to

Fig. 4 ABORTION



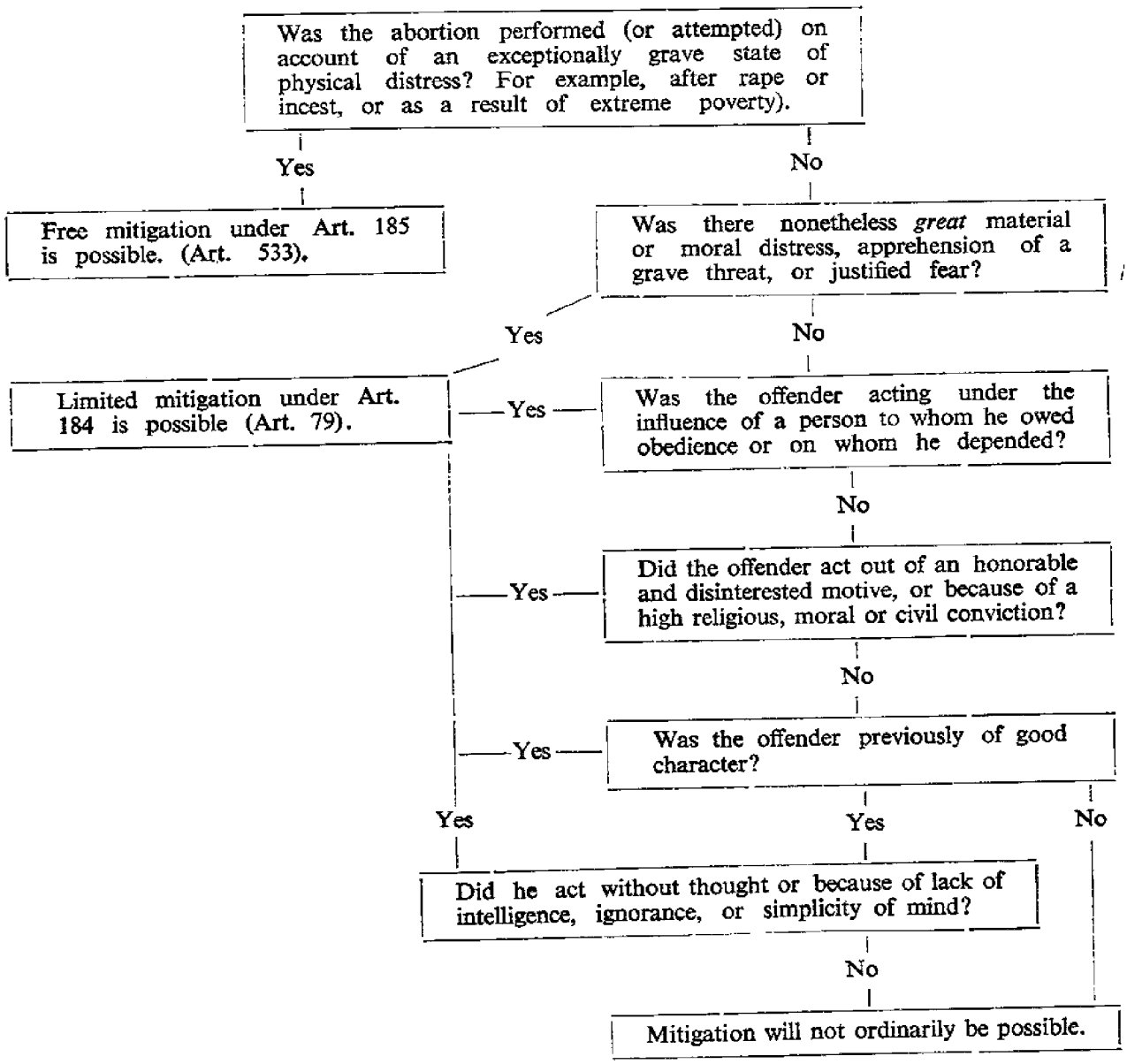
1. See next page for possibilities of aggravation and mitigation of penalty.
2. It is uncertain whether the woman is guilty of an offence.
3. In case of repeated offences, Art. 122 may also be cited.

ed in its ultimate disposition. There are, however, no office walls large enough to carry the necessary tree. Nor, if there were, would anyone wish to use such a complex instrument which would hardly simplify size limits the decision tree's effectiveness for the law. It is for this reason that there is an intuitive as well as a logical element involved in the construction of legal decision trees.

Fig. 5

II. Sentencing persons found to have violated abortion provisions

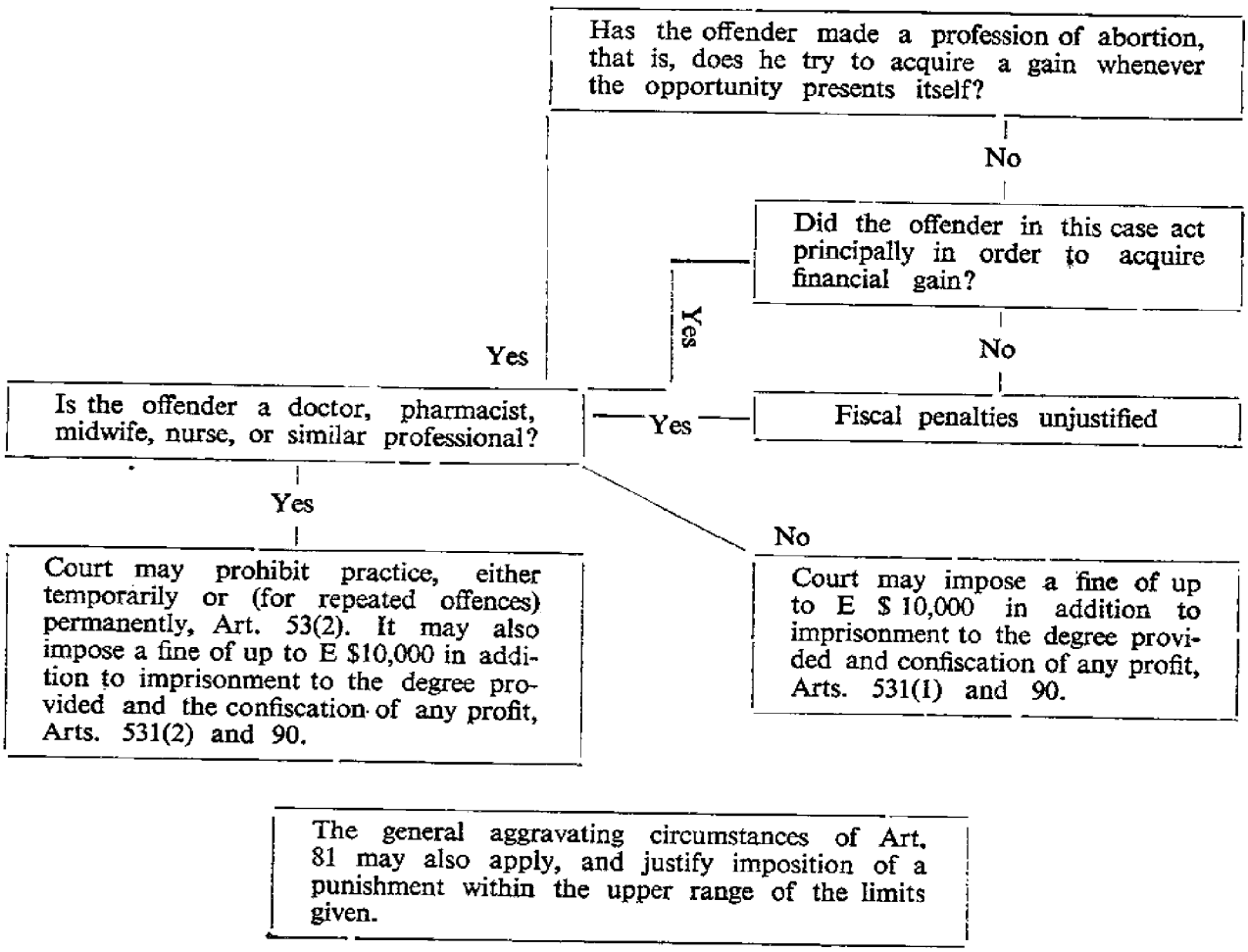
A. MITIGATION



It should now be clear what the decision tree can do. An important *caveat* must be entered at this stage to indicate what a decision tree cannot do. It cannot perform the truly creative part of the lawyer's task, but only the mechanical, part. A decision tree is helpful where and only where no dispute arises as to the

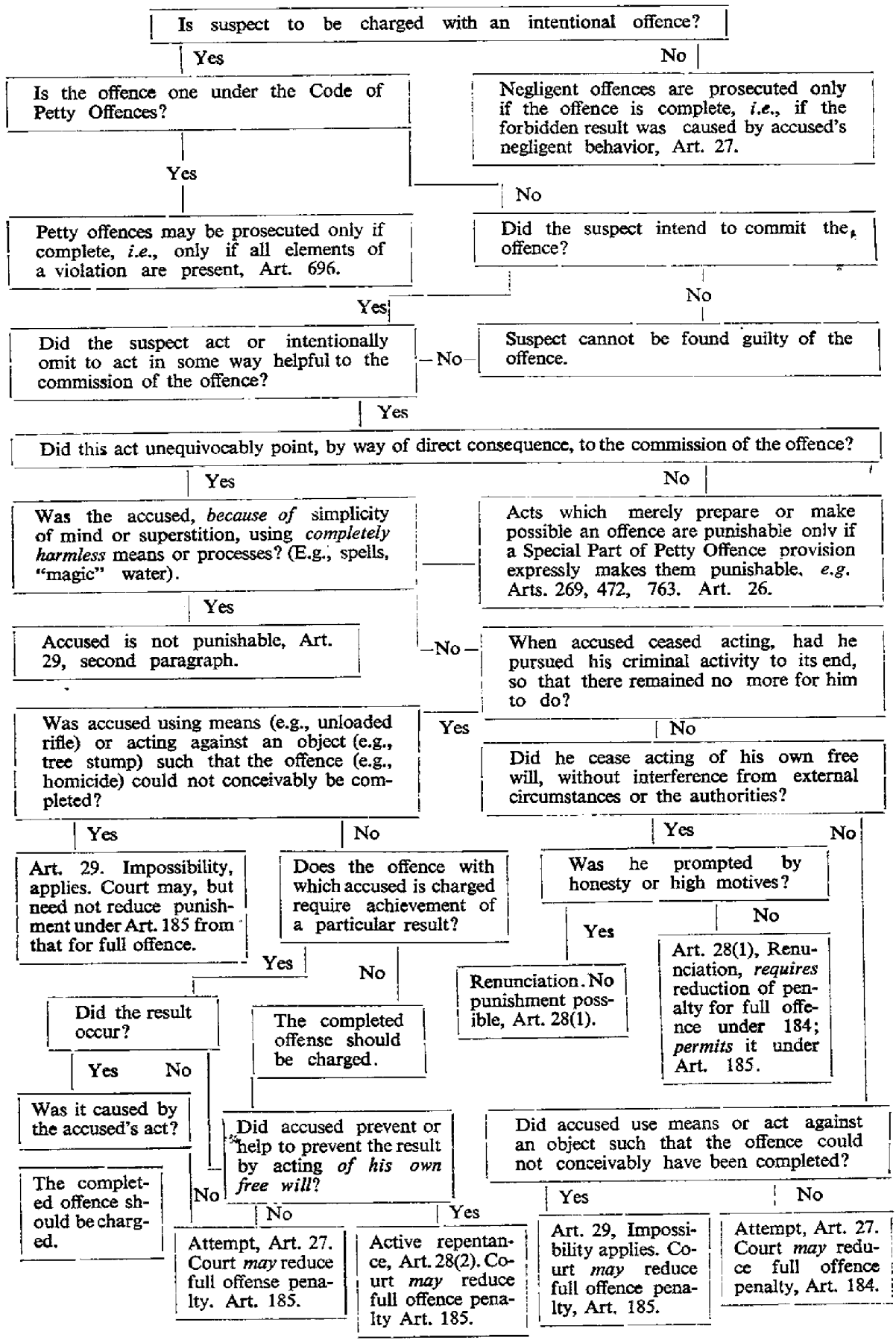
meaning of the questions which the user has to answer. We could, for example, construct a decision tree for Penal Code Articles 608-613 relating to offences tending to corrupt public morals, and at various points our tree would ask the user whether an act was "obscene" or "purely artistic, literary or scientific in character." No decision tree, no mechanical process, can answer such a question, save in the clearest of cases. The user of the tree can properly decide that an authoritative and lavishly illustrated medical text book on anatomy is not obscene, and that some work of "hard-core" pornography is. But he can do nothing with D.H. Lawrence's controversial novel, Lady Chatterley's Lover. That is a matter for the courts, for genuinely creative legal argument in the light of external authority and policy analysis. The decision tree, in fact, does the boring part of the lawyer's job.

B. Aggravation



Efficient legal administration, however, requires that this boring part of the lawyer's job be well done. Issues must be swiftly and accurately identified, so that appropriate evidence and arguments can be marshalled for creative work. The discovery of relevant code articles, their relationship and application, is an essential first step. In a nation such as Ethiopia, where formal legal education is not yet widespread, even this first step must often be difficult indeed. As stated above, what the decision tree might do is to facilitate the taking of this important first

Fig. 6 DEGREES IN THE COMMISSION OF AN OFFENCE (Arts. 26-31)



step. Presumably, it does not need a high-level legal education to know that one is dealing with abortion rather than with an electoral offence. Given, then, an appropriately drafted set of basic decision trees the efficiency of local law enforcement officers not possessing a legal education would be greatly enhanced, and at the same time those who did possess a formal legal education would be released from the mere mechanics of law to finding the more creative and more important tasks for which their training has fitted them.