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POSSIBILITIES OF CYBERNETICS IN THE  
RESOLUTION OF LEGAL PROBLEMS

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- USSR -

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POSSIBILITIES OF CYBERNETICS IN THE  
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[Following is the translation of an article by  
N. D. Andreyev and D. A. Kerimov entitled  
"O vozmozhnostyakh kibernetiki pri reshenii  
pravovykh problem" (English version above)  
in "Voprosy filosofii" (Problems in philosophy),  
No.7, 1960, Moscow, pages 106-110.]

At the present time, cybernetic study  
methods, following their use in natural sciences, are  
penetrating into the realm of humanities. This is witnessed  
by such a rapidly developing branch of linguistics as  
machine translation. In certain foreign countries the  
development of the problem of the application of cyberne-  
tics to the resolution of legal problems has already been  
attacked. Thus, at the International Conference for stan-  
dards on a common language for machine searching and trans-  
lation, that took place in the city of Cleveland (USA) in  
September 1959, a report was presented by Prof. L. E. Allen

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on a mechanical procedure for detecting and controlling syntactic ambiguities in the discourses of both sides in a case on trial. The report attempted to establish one of the possible ways in which cybernetic instruments could serve the needs of jurisprudence. (L. E. Allen. "Toward a procedure for detecting and controlling of syntactic ambiguity in legal discourse". International conference for standards on a common language for machine searching and translation, Cleveland, Ohio, September, 1959, pages 6-12). Despite the timeliness of this report, in our opinion it is necessary to point out the somewhat limited manner of the posing of the problem and the inadequate link to the practical requirements of jurisprudence.

It is known that a number of problems arise in law that require a considerable expenditure of intellectual labor, and the resolution of which might be significantly speeded up by the use of highspeed cybernetic installations. Such problems include: a reference information service in the field of law, certain problems of enactment of legislation, codification of laws, standardization of judicial practice, the conduct of documented criminal investigations and so forth.

In the resolution of the numerous problems of enactment of legislation, codification, interpre-

tation and application of law, a rapid and precise method of orientation in the most varied and fairly broad spheres of lawmaking is required. As shown by actual practice, this may be properly ensured only by the availability of an efficient reference-information service. The best and most complete form of such a service would be a specialized cybernetic machine for law that could, firstly accumulate and summarize a virtually unlimited volume of legal information, covering not only the all-union and the separate republics legislation of our country, but the legislation of other socialist countries, as well as, and to the extent necessary, that of capitalistic countries and international law, and, secondly, make any part of the accumulated information available on demand.

In a period of active building of communism, broad masses of soviet citizens take part in the creation and discussion of the most important projects for legislative action. In the process of the national discussion of projects for legislation the laboring people put forward a large number of concrete wishes, comments and proposals the object of which is the proper resolution of problems of law enforcement.

The complete and considered consideration of all the wishes and proposals put forward by the laboring

people, likewise may be ensured by the use of cybernetic machines. Naturally, the actual consideration of such proposals will remain within the competence of the enacting power, but all of the preliminary technical work may be speeded up considerably by the use of cybernetic machines. At the same time, cybernetic machines could provide for the orderly storage of all matters pertaining to the discussion of projected legislation, that for one reason or another, are not reflected in the new laws, but that could be useful in the discussion of other future projects.

Of great importance in the resolution of a series of problems arising in the course of enactment of legislation is the comparative analysis of the content, the form and the regulatory features of the law project under consideration and the methods and regulatory features for analogous social relations embodied in the legal systems of other countries or other historical periods. This work, as a rule, requires much expenditure of time and, because of the vastness of the material that must be analyzed, it is far from often sufficiently complete and exact. In order to help achieve this objective, cybernetic machines could be used, capable of sorting out the necessary data from the mass of accumulated material, for the benefit of the enacting power. In most cases such a selection will be accomplished

along established criteria, that would be fixed in the reference-information machine. It is possible, however, that the enacting power will require new special criteria, criteria that could vary significantly from one case to the other. For the resolution of such types of problems, it will be necessary to equip the reference-information machine with control arrangement capable of accomplishing various combinations of operations, in addition to the established and constantly utilized minimum.

At the present time, the problem of codification of soviet legislation is extremely timely. Codification of laws presupposes the conduct of a series of preliminary operations on legislative material; determination of the legislative material that must be codified; segregation of legislative acts that have been formally abolished by the appropriate organs; segregation of acts the statute of limitations on which has passed and has not been renewed, as well as acts which, although not formally abolished, have ceased to be applicable due to later legislation. A number of similar operations must be accomplished also within the provisions of the legislative acts that are being codified. Furthermore, they must be subjected to appropriate amendments: for example, certain articles must be excluded from the text that list acts that are being abolished; also

articles that have a single application or that are of a personal nature. It is also necessary to eliminate repetitions and contradictions between and within the acts that are being codified, and to bring together acts or articles within appropriate acts that are similar in content, etc.

The adoption of cybernetic machines for the accomplishment of various unwieldy secondary operations, connected with the preparation of a codification of laws, emphasizes the need of equipping the machine with varying selection criteria for legislative material, as well as criteria by means of which contradictions and repetitions as between acts (and articles) are located, together with statutes of limitation, limitations of applicability by sphere of action, type of persons or other specific characteristics. All of this confronts a cybernetic machine destined to service legal needs, as well as its controlling arrangement with requirements worthy of serious consideration.

Prospects are good for the use of cybernetic machines for the preparation of material on the generalization of legal practice. The volume of information available in this branch of jurisprudence, greatly exceeds that encountered in other branches of law. By means of machines, the fullest accumulation and preliminary systematizing of factual material covering an enormous number of legal

cases may be accomplished, together with a disclosure of most prevalent errors repeated in legal practice. It would also be possible to derive statistical indices regarding various types of breaches of the law and types of crimes:

Finally, cybernetic machines may be widely used in various types of legal expertise: for the legal verification of accounting practice, for checking the authenticity of documents in accordance with previously given official indications, the establishment of the authorship of documents by style and graphic characteristics and for other similar operations.

The use of cybernetics in the resolution of the above mentioned and other types of legal problems, will require much preparatory work. In the first place, an information language must be developed in the areas of law in which it is proposed to apply this technique, or for legislative and other material that it is proposed to subject to a preliminary operation by means of computers.

A cybernetic machine carries out operations with coded numbers. Any operation involving the digest of information by a machine, constitutes some rearrangement of the numbering codes of the information (for example, the addition of a suffix to to the root in a machine translation is accomplished by the addition of certain numbers

to the number representing the root of the word). Any information, therefore, including legal information, must be fed into the machine in coded form. The legal information fed into the cybernetic machine, therefore, must be prepared in accordance with the problems put to the machine. The operations accomplished by the machine for the resolution of legal problems requires the development of a system of numbering symbols (algorithms). The development of an algorithm presupposes the existence of a well constructed symbolic language for the noting down of this algorithm. In connection with this construction of an information language in the case of law, it would be appropriate to start with the establishment of an effective symbols system - a system of signs and rules for using these signs - that would make it possible, after the legal information has been digested, to write down any algorithms in an exact command language. Thereafter, the transition to a numbering code for machine operation will no longer present much difficulty.

The symbolic language used in writing down the algorithm, with the addition of a symbols dictionary of the legal concepts being examined, including acts and statutes, in its totality forms a complete language for the noting of juridical information in a cybernetic machine.

Such complete languages are usually known as information languages.

In connection with the development of an information language for law, at least five specialized problems come up. First of all, it is necessary to develop a system of criteria in accordance with which all the legal material fed into the machine will be classified. For example, in organizing the memory of the reference-information machine, the laws of a certain country must be identified by means of the same code (different for every country) and stored in fixed memory units. This will enable the receipt in a speedy and simple manner of all information regarding the legislation of a given country on demand. Each legal statute must have its own special unchanging code, stored in fixed sections of a memory unit. Finally, it would be possible to utilize simultaneously both coded criteria and obtain all of the information for the law statute of a given country that is of interest to us.

Naturally, the criteria according to which the machine operates, could be most varied and could be utilized in the most varied combinations. Such a system of criteria could include, for example, legal practices standard for a given region of the country, the application of standard legal practices to specific population groups, organs,

organizations and officials, the limitations of legal practice according to age, sex, family position, etc.

In this specific case, the selection of information to be fed into the machine is first accomplished by specialists, and the machine thereafter does not modify the volume of information that has been fed into it. By contrast, the problems that we will examine below, are connected with the introduction into the machine of specific selection criteria, by means of which the machine will admit into its memory units only information needed by the user of the machine. Obviously, in this case the volume of information stored in the machine will be, as a rule, considerably smaller than the volume fed to it.

The selection criteria (in the same way as the systematizing criteria of the preceding problem) may be quite varied. The simplest one is the criterion that determines the application of legal statutes in time. This brings us to the second specialized type of problems, the resolution of which will enable us to establish which of the legal acts or articles that have been fed to the machine are no longer in force and which are still active. In particular, in codifying law the machine will be able rapidly to ~~xxx~~ segregate from the mass <sup>of</sup> legislative material fed

to it, the statutes or articles that have either been nullified by subsequent legislation, or the statute of limitations for which has expired. The problem here consists in devising a system of criteria that would characterize the period during which legislation is in force, to develop a methodology that would permit the extraction of these criteria in the course of a machine analysis of a legal text, establish algorithms that would relate the criteria to each other and come up with a conclusion regarding the need to maintain or discard specific legal provisions.

Another selection criterion consists in the internal verification of legislative material to eliminate/repetition. The machine could, in a very short time examine a vast amount of material and expose repetitions both as to form and as to substance (even with a certain degree of difference in formulation). Thus, for example, in the preparation of a legal project it is sometimes proper to consider whether parts of a given provision are entirely or partially repetitive of existing legislation. In this case, the machine could, of course, only establish the existence of such repetitions. The decision as to whether the repetitive provisions should stand because of their importance and which should be discarded, is that of the lawmaking organ. In such cases the special problem comes

down to the development of a so-called coded condensation of the material, i. e. to the establishment of specific methods of designating portions of legal documents, a method that will permit the machine to uncover the coinciding sections of legal documents.

The next selection criterion consists in a verification of the material fed to the machine for contradictions. As an illustration we may cite graphic machine expertise in legal cases. In this case the machine is fed ~~xxxxxx~~ first a portion of the text, that is analyzed by means of an electric scanning device and in accordance with a given program, as a result of which there appear in the machine's memory characteristic graphic peculiarities of the text (handwriting). The successive introduction into the machine of other portions of the text will permit the machine to bring out whether ~~xxxxxxxxxxxx~~ these coded characteristics are the same for all portions of the text that have been introduced, or whether, on the contrary, certain portions have different characteristics, and are, therefore, in a different handwriting. It is easy to conclude from the above that such problems really come down to the establishment of a system of characteristics, a deviation from which would be sufficient to qualify the contradictory nature of the material as being internal.

Finally, it is possible to select the material fed into the machine from the standpoint of its conformity or nonconformity with data permanently stored in it. An example could be the situation in which a machine has in long term storage information that consists in the summary of the total amount of certain decisions of the plenary ~~of the Supreme Tribunal of the USSR~~ Supreme tribunal of the USSR, and all decisions and sentences of actual legal cases"are subjected to the algorithm by which they are compared with the decisions of the plenary of the Supreme tribunal of the USSR. For the resolution of this and similar type problems, it is necessary to develop a system of criteria by means of which it will be possible to establish the conformity or nonconformity as compared with the permanently stored information and that which is fed into the machine for comparison with it. An algorithm for the identification of the conformities and non-conformities also must be developed.

The totality of the special problems outlined here are by no means exhaustive of the general problem of application of of the modern cybernetic technique for legal needs. Nevertheless, even in this initial stating of the problem, it will be seen to be so broad and varied in aspect, that it cannot but attract the attention of the scientific community.

We are far from thinking that the application of mathematical instruments and of all that is connected with the use of cybernetic installations in the resolution of legal problems will modify the substance of science, of law. The application of cybernetics to the resolution of legal problems is but a tool in the hands of man, who in all cases preserves for himself the function of selecting one of several alternatives and the power of decision. A machine generally cannot replace man, especially in the sphere of government and law, where the responsibility for every decision, for each action, is precisely that of the people. At the same time, under modern conditions, the broad utilization of the powerful auxiliary that cybernetics offers us, is quite appropriate. It is clear that the resolution of many legal problems with the help of the cybernetic technique will require, first, the accomplishment of important preparatory work (creation of an information language for law, the construction of specialized cybernetic machines), and, second, the training of personnel well versed in problems of jurisprudence, in the logical-linguistic digest of information and in other problems of cybernetics. At the present time the first steps in this direction have been made in the Leningrad university. There has been created a pioneer group of

scientific workers, fellows and students that has commenced preliminary work in the creation of an information language for law. It is obvious, however, that the successful continuation of such research depends on ~~the~~ additional effort attracting to this promising and especially interesting work, both in terms of a broadening of research by introducing it into other scientific centers, and by placing this research on a deeper and more solid base.

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FOR REASONS OF SPEED AND ECONOMY  
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