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AUTOMATED DATA PROCESSING

On the Experience of Computerized Processing of Data on
Geographical Names in the USSR

Paper presented by the Union of Soviet Socialist Republics ^{1/}

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FOURTH UN CONFERENCE ON THE
STANDARDIZATION OF
GEOGRAPHICAL NAMES

Geneva, August 24 - September 14, 1982
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ON THE EXPERIENCE OF COMPUTERIZED
PROCESSING OF DATA ON GEOGRAPHICAL
NAMES IN USSR

Submitted by the Government of
the Union of Soviet Socialist
Republics

ON THE EXPERIENCE OF COMPUTERIZED PROCESSING
OF DATA ON GEOGRAPHICAL NAMES IN USSR

Computer-aided data retrieval system for toponymes (AIPST)* is designed to collect, process, store and to retrieve data on place-names for users. The data include:

- Russian name;
- national name spelling;
- type of feature;
- political-administrative and physio-geographical belonging;
- data source;

The AIPST system accumulates, processes and retrieves data on geographical names thus relieving qualified specialists of manual labour of reading the data from maps, data correction, place-name sorting according to Russian and national alphabet and responding to customers' requests (by lists). At the same time the computer-aided system will provide new quality of service and new types of data to the users. It will provide:

- selective data distribution according to the interests of the constant users;
- retrospective search of data in large accumulated files;
- computer-aided compilation of documents on place-names.

As the amount of representative data massive will steadily grow, the selective data retrieval mode of operation (IRI) will start functioning. Later retrospective data search mode of operation will be working (RPI). Both will answer to diverse requests of the users. The RPI mode of operation will thus work only when full amount of data on place-names will be stored in computer's memory.

The IRI mode of operation can function with place-name data for a certain period of time. The data search is carried out in IRI mode of operation according to the requests of users, while number of users is limited. Between the users and the system a connection is set up, which improves the results of the work.

The IRI mode of operation will provide the users with place-name data with a high degree of completeness and precision. It will provide documentation copies on place-names and data prints of the automated digital printer (ACPU). The user can change the formulation of his request if he is not satisfied with the original request or its pattern. Thus the IRI mode of operation will continuously have the efficient reverse connection with users.

*) This abbreviation and other ones are based on the Russian initials.

At the same time registration-statistical data should be recorded in the system. It will be necessary for further improvement of the system. This ought to deal with modification of request pattern and new forms of data retrieval.

The system is designed mainly for map-making, therefore its software has certain peculiarities. The whole system consists of the main and auxiliary, or inquiry files.

The main files are based on place-name catalogue (basic catalogue of geographical names) and list of geographical names of maps and atlases.

The AIPST data input includes description of forms at all stages of processing. As the main sources of data inputs are the processed place-names and auxiliary data, and editorial comments on the map design, the task of the input is mainly to describe the forms of data representation for place-names and auxiliary command information on all levels of its consecutive transformation. The stages of place-name data transformation and auxiliary command data include:

- 1) place-name cards in a massive or extraction of data from map (atlas) in an appropriate form;
- 2) tape-punching of data on place-names taking into account the requests of the editor, technologist and other users;
- 3) ACPU typing of the main data file;
- 4) correction of the main data file;
- 5) input of the corrected main massive of data via either display (VTU) or data prepare unit (UDP);
- 6) sorting of the main data massive according to the given conditions;
- 7) determination of the volume to be published, clarification of the basic parameters of the edition and of number of columns;
- 8) formation of draft-columns and multi-column blocks;
- 9) output of draft-columns or block of data of geographical names on display or automatic digital printer;
- 10) correction of the draft, correction of the same geographical names;
- 11) input of the corrected data of the same names through VTU or UDP;
- 12) formation of a column or a block of columns with a vertical switch-off.

Auxiliary massives are based on internal hardware units, valid documentation on administrative-political belongings of place-names, abreviations and codes of the objects, nomenclature and so on. The stages of transformation of the auxiliary and attendant commands are:

- 1) punching and input of the print and gaps and their parameters;
- 2) input of tables of transformation of computer codes (EVM) into codes of the auxiliary units (data prepare unit, photo-type setter, tape recorder, plotters and so on);
- 3) input of the abbreviations and codes of geographical names and administrative, territorial and physio-geographical location;
- 4) input of the World-map (1:2 500 000) nomenclature;
- 5) clarification of new and erroneous place-names and administrative, territorial and physio-geographical location;
- 6) typing of reference data; its correction and continuous addition;
- 7) formation of the reference data;
- 8) input of the main data massive of geographical names.

Hardware

The system was built using home-made equipment with some alterations. They were aimed to adapt the hardware for mapping requirements. There are three groups of the hardware:

- 1) data prepare units - key-board programming devices with punch-tape units, tape-recorders;
- 2) correction units to correct the tape-punch;
- 3) EC-1033 computer, CM-4 mini-computer;
- 4) data output units - automatic digital printer (ACPU), display, photo-type setters, plotters.

The photo-type setters require certain modification for cyrillic and latin print for maps, and addition of diacrytic symbols and auxiliary characters for both alphabets.

Software

A complex of programmes was developed for the AIPST system. It includes:

- 1) a complex of programmes to connect hardware units and computer, for the codes of data prepare unit; tape-recorder and display differ from the computer by their codes;
- 2) a complex of programmes for data input-output and data correction in the computer;
- 3) a complex of programmes for computerized processing of data - sorting and matching of data according to the requests;
- 4) a complex of programmes data editing - formation of forms, columns, pages etc.

Functioning of the system in
different operational modes

For efficient functioning of the system in the IRI and RPI modes of operation a representative amount of information is needed.

At present the system functions in the mode of developing reference documentation on place-names. At the same time accumulation of reference data is going on.

A number of methods for making of list of geographical names had been developed including:

- 1) method of compilation of list of geographical names for the World Map scaled 1:2 500 000;
- 2) method for compilation of lists of geographical names for folded reference maps;
- 3) method for compilation of lists of geographical names for World Atlas;
- 4) methods for republishing the above maps and atlases;
- 5) computerized methods for subdivision of transferences and photo-type setting for multi-coloured lists of geographical names;
- 6) methods for compilation of reference-dictionaries (gazetteers) of geographical names.

One of the most labour-consuming processes of documentation of geographical names is recording, correction and tape-punching of data on composing and programming units. There are three kinds of place-name recordings while compiling a map - a) recording for type-setting to obtain pasted labels with names; b) recording of names for compilation of transliteration list; c) recording of names for compilation of geographical names' list.

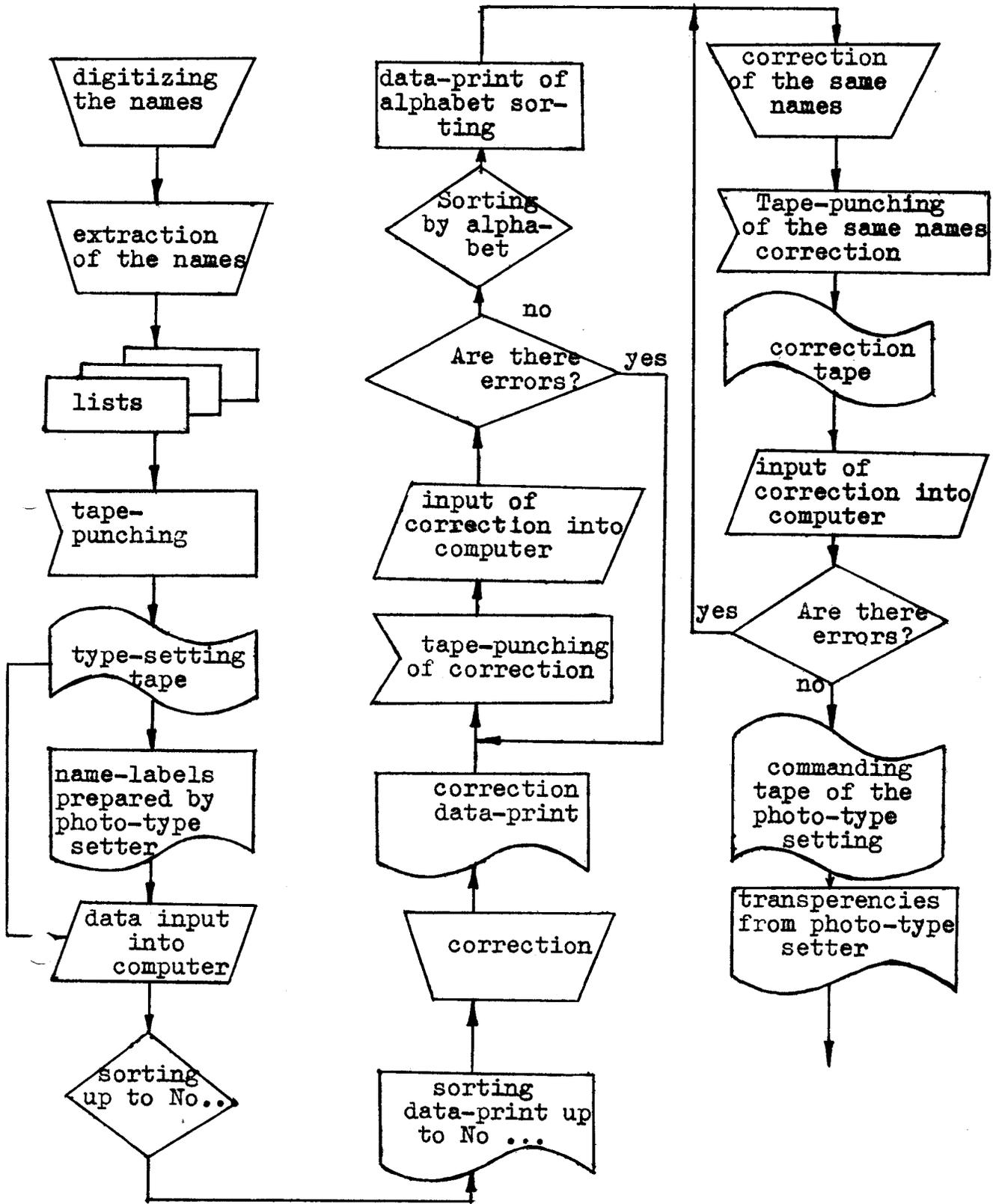
Each recording needs correction, tape-punching and printing.

There is a new automated method which uses one name recording for name-label, list of transliteration and list of place-names. This is the most promising method which saves the time for map production, reduces number of name recordings to two, decreases the quantity of errors and therefore makes the correction easier. The quantity of punch-tape and time for tape-punching is reduced up to 30%, the errors while tape-punching are reduced as well, and the paper is saved. The time of data input into computer is saved, the computer memory is less loaded.

The general scheme of preparation of place-name labels, transliteration lists and lists of geographical names from extraction for type-setting is as follows (scheme No 1):

- 1) digitizing of place-names in each sheet of map from 1 to n;
- 2) extraction of place-names according to types of print and kinds of objects;
- 3) tape-punching of name-recording using data prepare unit;
- 4) obtaining the name-labels from photo-type setting unit with commanding tape;
- 5) input of the tape into computer;
- 6) place-name sorting according to their numbers in each map-sheet;
- 7) data-prints of transliteration list from computer;
- 8) correction of transliteration list by a toponymist;
- 9) tape-punching of the recorded data;
- 10) input of the corrected data into computer;
- 11) sorting according to the alphabet;
- 12) data-print of the sorting;
- 13) correction of the same place-names;
- 14) tape-punching of the corrected data;
- 15) input of the tape into computer;
- 16) obtaining of the commanding tape for photo-type setter;
- 17) transparencies of the list of geographical names on the photo-type setter.

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Scheme 1. Diagramme of obtaining of place-name labels, transliteration lists and lists of geographical names from the extraction for type-setting