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REPORT

SUBJECT Summary of a report on the Progress of Map Compilation in the USSR by Soviet Geologist N Belyaevski

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1. a four page summary by Soviet geologist, N Belyaevski, of a report on the progress of map compilation in the USSR, submitted by him at the December 1962 meeting of the commission in Paris.
2. This summary gives an account of the progress of the USSR on geological mapping, and tectonic and minerogenic maps.
3. It briefly describes Soviet trends in the compilation of survey maps in conjunction with geological mapping, preparation and use of tectonic maps and requirements for drafting minerogenic maps. UNCLASSIFIED

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COMMISSION DE LA CARTE GEOLOGIQUE DU MONDEON THE PROGRESS OF MAP COMPILATION IN THE USSR.

Summary of a report by

N. Bolyaevski.1 Geological mapping.

Two tendencies can be distinguished in the compilation of survey maps: one is characterised by the drafting of maps to correspond to the complex problems and has resulted in a series of maps, of which the preparation became possible during the process of accumulating facts and data. During the 1st years we succeeded in increasing the number of 1:5,000,000 maps of the USSR which cover geologic, tectonic, neotectonic, geomorphological, Quaternary, hydrogeologic, magnetic anomaly, metallogenic etc map.

The preparation of a series of maps 1:5,000,000 illustrate conveniently the geologic structure of regions of the platform type and is carried out in large areas of the country with independent geological-economic considerations. The geologic maps of the Siberian platform were already shown at the Copenhagen Congress; these maps are now supplemented with new data and can now be republished. A series of maps on this scale is being completed for the East European (Russian) platform.

Another trend in geologic mapping is the increasing tendency to reveal buried geological structures. New maps have appeared and the old ones have been improved.

Quite recently the compilation of the Litho-facies Atlas was completed on a 1:5,000,000 scale for the European part of the USSR. An atlas on a 1:7,500,000 scale is being compiled for the entire territory of the Soviet Union. It will include scores of lithological-palaeogeographical, palaeotectonic maps etc.....

In other areas maps showing reservoir capacity, subsurface drainage, hydrochemical maps are being prepared. Deep drilling has necessitated drafting maps indicating the thickness of overburden, geological structure of folded basement rocks under the platform cover and other features due to the development of the earth's crust?

The picture of the geologic map compilation in the

maps which are intended for the Atlas of the World. The first circum-polar geologic map of the Arctic is of great interest and includes the geological structures of North America and Greenland.

2. Tectonic Map

The 1:5,000,000 map of the USSR has frequently been shown at conferences; that on a 1:10,000,000 scale has recently been prepared. Experimental maps 1:2,500,000 are now being tried under the direction of T.N. Spijerski. The main aim of this map is to show the particular development and structure of certain regions. It shows further: structural stages, major folds and faults, magmatic complexes and, on the platform regions: isolines showing the structure of typical units of the cover, isopachs of the sediments. The map reflects the tectonics in a way as yet unachieved.

The drafting of this map resolved many of the problems of the larger scale tectonic maps (1:1,500,000 - 1:500,000). The need for these maps is now felt for the preparation of previsual and metallogenic maps. Maps at this scale can be divided into three groups: tectonic maps, general maps and specialised tectonic maps.

The first neo-tectonic map of Russia was published two years ago (1:5,000,000). Further maps, based on this latter map, are being drafted on a larger scale; firstly in the oil-bearing regions (Turkmenia, Western Siberia etc). They are all experimental. The analysis of neotectonic and **geomorphological** data (morphometric analysis) facilitates greatly those of seismic data.

The ordinary tectonic maps show structures controlling the repartition of magmatic manifestations, depth of deposits etc. In the platform areas, the hypsometric position of two or more horizons are indicated by isolines, faults and local geophysical anomalies. Special attention is paid to structures determining mineral repartition and magmatic phenomena when present.

The tectonic maps of platform areas have considerable practical application in the search for favourable structures for oil drilling. They **like** the reservoir capacity maps are indispensable for research for oil and underground water.

Specialised maps are now being drafted for specific mineral prospecting (bauxite, coal etc). They show essentially the tectonic relief of the basement, its depth as well as interpretation of lithological and geophysical data.

The study of the structure of or fields has shown the necessity of drafting large scale structural maps (1:25,000 and larger) which indicate all the fundamental elements of faulting, folding etc which effect mineral distribution. These maps are still experimental and their content varies according to the structural characteristics of the deposit: they will assist in prospecting for hidden or deeply buried deposits; they tend towards the provisional metallogenic maps.

The inclusion of geophysical data on tectonic maps, enlarges their scope and tectonic maps now are based on observed data.

3 Minerogenic maps.

During the 1958 Meeting of the Commission for the Geological Map of the World in Paris, the USSR had the opportunity of showing some patterns of small scale minerogenic maps, on which it was possible to recognise zones of similar geological structure and subsequently similar ore mineralisation.

Such maps demonstrate many important problems of regional and general metallogeny: the polycyclic condition pertaining in the majority of geosynclinal belts and geosynclines characterised by prolonged multi-phase development. The important role of metallogenic 'isolation' of the intrusions is stressed; that of deep faults as regulators of the distribution of magmatites and their accompanying ores as also endogenic deposits of mineral resources connected with them.

Small scale maps lead to the drafting of larger scale maps where one can determine more precisely sectors favourable for prospecting but also forecast the type of mineral deposit and give quantitative estimations. In new regions, where sufficient geologic data is missing, 1:500,000 is considered suitable for minerogenic and provisional maps.

The requirements for the drafting of minerogenic maps are now known. They must carry the main peculiarities of the geologic formations so as to show the paragenetic relations between mineralisations and certain manifestations of tectonics, magmatism, sedimentation, metamorphism etc. The demonstration of spatial and genetical connections between ore deposits and country rock is of special importance. Direct as well as indirect characteristics of deposits must be reflected on the map: i.e; results of geophysical work geochemical and mineralogical investigations.

This general and special data may overburden the map and render it

illegible. Practice has shown that it is necessary to compile not one, but several mineragenic maps which group the ores according to their genetic affinity. For example one may be concerned with antimony and mercury deposits. The maps show on a specially selected geologic background a special overprint which includes symbols for ore deposits and their manifestations. Reservoir capacity, paleogeographical etc information can be added according to the ores concerned.

Conventional symbols must be clear and easily remembered.

E.T. Shatalov has suggested a rather detailed system which has been successfully applied for mineragenic maps.

These maps generally show, according to the total sum of information available:

- a) known deposits, their extent and concentration.
- b) areas characterised by economic deposits and possible occurrence of industrial deposits.
- c) areas favourable for prospection.
- c) areas of possible occurrence of deposits .

Qualitative classification of areas according to probable economic value only reflects the initial stage of prognostication. Experimental work on these maps is only starting, but they are the base for every day and planning of prospection.