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THE MOLDAVIAN AFFILIATE OF THE ACADEMY OF SCIENCE USSR

/Following is the translation of an article by Ya. S. Grosul in Izvestiya vostochnykh filialov Akademii nauk SSSR /Proceedings of the Eastern Affiliates of the Academy of Science USSR/, No 8, 1957, pp. 155-162./

According to the directive of the government of the USSR in 1946 there was created in the city of Kishinev a scientific-research base; in 1949 it was reorganized as the Moldavian Affiliate of the AN USSR /Akademiya nauk SSSR = Academy of Science USSR/.

Working within the base were the following: the former Republic scientific-research institute of language, literature and history and the new scientific subdivisions of the departments of geology, soil mechanics, botony, zoology, energetics and water control.

The beginnings of the scientific activity of the base were carried on under the difficult conditions of the postwar period, and this was further complicated by the fact that Kishenev had been greatly damaged by the Hitlerian forces. The local scientific forces were extremely limited due to the fact that a goodly portion of the personnel were people who had received their education and training in the VUZes /Institution of higher learning/ of boyar Rumania; as a consequence of this we had to carry on serious ideological work. However with the aid of the directing organs of the Republic and the Academy of Science USSR all of these difficulties were overcome.

At the present time the Moldavian Affiliate is composed of the Institute of Biology, the Soil Institute, the Institute of History, Language and Literature, the Botanical Garden, the Seismographic Station, and 8 independent departments which are geology, construction materials, energetics, economics, inorganic, organic and analytical chemistry, physics and mathematics.

Working in the Affiliate is a collective of qualified workers among whom there are 19 doctors and more than 70 candidates of science. In the near future we expect the full staffing of the Affiliate by the young scientists who are now doing their graduate training /aspirant/ in the Affiliate itself and in the central scientific institutions of the AN USSR. A significant part of the scientific and auxiliary personnel in the Affiliate comes from the indigenous population of Moldavia.

Moldavia is a region of concentrated fields of agriculture; fruit growing and grape cultivation play a decisive role in the economy of the Republic and also determine the direction in the development of the canning and wine-making industries which are being completely made over.

Naturally this has left its mark on the direction of scientific activity in the Affiliate during the period of its inception. The Affiliate is concerned chiefly with research in the field of biology in pursuing the goal of solving the most acute problems in fruit growing and viniculture during the transitional period from private farms to kolkhoz and sovkhoz forms of organization in agriculture.

In the first years as was to be expected the research was not conducted on such a high theoretical level as the scientists of the Affiliate might want since it was essential to give in the shortest period of time and by any possible means primary assistance to the national economy of the young Republic.

The Affiliate has worked out and is now successfully introducing into kolkhoz and sovkhoz practices a number of measures which will increase the productivity of labor in fruit growing, viniculture, wine making and field cultivation.

We have given scientifically based ways and means for reducing the individual private orchards and vineyards to large massive plots which will lighten the mechanization spent on them and as well their reconstruction from the point of view of sharply increasing the productivity and earning capacity. We have worked out experimentally and tested under production conditions a new form of grape vine which is called "Moldavian trellis" and which yeilds an additional 2-3 tons per hectare and simultaneously reduces labor costs by 15%. We have proposed a new system of supports for the vines which is suspended and combined; this reduces the expenses for lumber spent in building the trellises by 8-10 times.

In a short time the Affiliate was successful in solving the problem of raising grapes on land which was unsuitable due to phylloxera by replacing the low grade grapes with others that were resistant to phylloxera; they also solved the problem of using plantings from cultivated types of grapes which have been grafted onto American vines (phylloxera-resistant). The Affiliate has worked out a system for periodically filling the soil with dichlorate and if this does not always lead to the complete elimination of the phylloxera at least it limits the development of the pest to a scale where for all intents and purposes it is not dangerous for the vines (Ya. I. Prints).

The scientists in fruit growing have evolved and are now distributing 36 better local and imported grades of fruit trees including a number of the most popular sorts; they have worked out methods for the protracted storage of fresh fruits which will provide a significant reduction in losses and will allow the organization of industrial storage on a wide scale.

We have worked out and are now introducing into production the technology for producing high quality wines from hybrids of local producers and European varieties and also a method for speeding up the yeild of high quality desert wines.

The soil scientists and the agricultural chemists have studied the chemical properties of the Republic's soil and have carried out the

soil mapping of a large part of its territory. They have worked out and are now introducing into practice measures for the fight against soil erosion on slopes by the means of using so-called "buffer fallows" and terracing the steep slopes under the vineyards. They have created a sientifically based system for fertilizing the orchards and also worked out the principles for chosing the plots and preparing the soil for commercial fruit crops.

Crop growers have established the effictiveness of periodically using terrace plowing at various depths in the crop rotation in Moldavia; they have worked out a system for fall-winter plowing and have proposed the method of concentrated and mixed planting of corn with some annual grasses (Sudan grass and sorghum) which will have a great saving effect.

The icthiologists and hydrobiologists of the Affiliate have evolved the biological bases and have shown the possibility of an annual breeding of carp in the pond fish farms in the Republic which will provide a yield of marketable fish to the amount of 700-800 kilograms per hectare of pond area; this will lower the net cost of the product by 30% in comparison with the system of two-year cultivation. They are also studying the possibility of commercially raising whitefish and small sturgeon with the carp in the aim of increasing the output of valuable commercial fish per hectare of pond area and a fuller utilization of the feed resources of the ponds. They have also shown the possibility of creating a breed of early spawning carp in the aim of increasing the amount and improving the quality of the fish breeding stock. They have studied the hydrobiological regime of the Dnestr and its tributaries over 1100 km, and have determined the possibilities for fish raising in the basin of this river. They have given particular attention to the multiple study of the recently created man-made reservoir on the Dnestr (near the Dubossarskaya Hydroelectric Station) in the aim of finding its most rational mastery and use in pisciculture.

The economists through the example of a number of farms have scientifically shown the experience in the organization and planning for kolkhoz production and in the organization of the food base in Moldavia. They have studied the condition of the raw materials for the wine industry in the Republic and have worked out the prospects for its development; these prospects envisage the possibility of expanding grape planting in 1955-1956 by 100,000 hectares.

They have worked out the bases for the development in Moldavia of the production of building materials prefabricated from concrete and reinforced concrete structures; the savings accrued from introducing these materials under the existing level of technological development can be determined in the neighborhood of 100 million rubles for the Five-Year Plan.

The soil experts, the biologists and the economists of the Affliate working in close cooperation with the workers of other scientific institutions and VUZes of the Republic, have provided the scientific bases for the divisioning (into rayons) of Moldavia into agricultural production zones. The putting into practice of this planning

and the placement of agricultural production as proposed by the Affiliate will provide the maximum efficiency in the use of the particular features of the local natural and economic conditions of Moldavia in the interests of the most rapid development of its agriculture. The same collective has given the scientific bases in the zoning measures for providing for the maximum output of agricultural production for 100 hectares of arable land.

The Department of Construction Materials has studied the physical and mechanical properties of the cut limestones of Moldavia and has worked out a method for the mechanized production of block construction stone by the means of using a stone-cutting machine designed by a scientific worker of the Affiliate (K. P. Galanina) which provides for an increase in labor productivity by 16 times. The Department has also worked out a chamber-column system of extraction which increases the annual production by nearly two times in comparision with other methods. At present the Department is is working out the rational technology for binding materials, concrete and ceramic products from local raw materials.

However in critically evaluating the results of the work which the Affiliate has conducted, we in no way can recognize them as sufficient.

The national economy and the culture of our Republic is now in a sharp upswing. During the sixth Five-Year Plan the agriculture of Moldavia and in particular viniculture, horticulture and livestock raising will take several great leaps ahead. The leading field of industry in the Republic which is food is developing at a rapid rate and depends on the intense and constantly expanding raw material base. Moldavia is becoming a region with a highly developed light industry such as shoes, silk fabrics, etc. All of this brings forth new demands for our scientists. Thus the scale of the scientific research being conducted in the Republic must be expanded and their theoretical level significantly increased.

The biological sciences occupy an important place in the scientific research of the Affiliate. The Soil Institute is conducting a broad study of the soil covering of Moldavia and its agricultural and commercial properties in the aim of creating a soil map of various scales which will be of great importance for improving planning in agricultural production (the directors of the work are the Director of the Institute and the active member of the All-Union Academy of Agricultural Sciences Imeni Lenin, N. A. Dimo and P. V. Ivanov). As a result of this work, and in addition to the soil map, the basic monograph Pochvy Moldavskoy SSR /Soils of the Moldavian SSR/ will also be prepared.

In the aim of working out and founding a system for the most radical anti-erosion measures for mastering the hills planted in orchards and vineyards, they are studying the development of the erosion process on the territory of the Republic and the influence of varied-depth terrace and non-terrace plowing on erosion and the fertility of the slopes' soil. Under the leadership of I. G. Dikusar they are studying the principles of soil nourishment for agricultural crops and are wor-

king on the methods for fertilizing fruit, grape, vegetable and grain crops. Theyare also doing research on the role of micro-organisms in feeding agrciultural crops with phosphorus; they are studying the effectiveness and methods for using bacterial fertilizers for grain and vegetable crops. They are also bringing out the role of microflora in soils planted under apples and in fields of crop rotation in the aim of establishing a method for regulating the nutritional regime of crops by the aid of micro-organisms.

The Botanical Garden of the Affiliate is conducting important work in the field of introducing woody, ornamental, oil producing, fodder, food and technical crops for use in the national economy. At the same time they are working out the biological bases for developing species and forms of crops which are new for the conditions of the Moldavian SSR.

The recently created Institute of Biology of the Moldavian Affiliate of the AN USSR is engaged in a very broad range of scientific research. They are conducting work in plant physiology that will have important practical and theoretical results. The aim of their work is to evolve the methods for actual control of the harvest yield for crops on the basis of a thorough knowledge of the regular laws of development for plant growth. They are studying functional (non-parasitic) diseases in fruit trees and are evolving the meansfor their prevention. They are studying the reasons and the conditions for damage to grape vines when covered, and they are studying the possibilities of cultivating some European varieties of grape without covering them in winter. They are doing research on the physiological peculiarities of the growth of grape vines in the aim of establishing the optimum havest load in accordance with the growth conditions, and they are conducting work on increasing the harvest yield and cold resistance of plants which prefer warm climates by exposing them to cold before planting.

The Laboratory of Plant Biochemistry is conducting research chiefly in the field of the biochemistry of fruit and vegetable crops. As a result of the study on the physiological and biochemical processes which regulate the ripening of fruit after harvesting, they have solved the basic scientific questions connected with the commercial preservation of apples in Moldavia. At present the collective of the Laboratory is studying the regular patterns of development of the biosynthesis in high polymeric carbohydrates in melon crops in the aim of using them in the canning industry. This research, and especially the working out of the biological bases for preserving fruit have national significance.

One would find great interest in the work on the study of the dynamics of accumulation and conversion of vitamins in the ripening and fermentation of vegetables and fruits. The aim of this is to direct these processes to the desired end of increasing the amount of vitamins and general nutrition in fresh and fermented fruit and vegetable products. An important task of the scientists is also to

compile handbooks on plant biochemistry for the plants which are grown in Moldavia for such handbooks are needed in both the agriculture and the industry of the Republic.

A yound collective of scientific geneticists, in using the methods of cytoembriology, is working out a number of cardinal questions in genetics dealing with the fields of heterosis, sterility and inheritabil/ In the future they will take up in their research the questions of ity. stimulated impregnation, polyploid, artificial rearing of the seeds, etc.

The fauna of Moldavia and particularly the ornithological fauna up to now is still far from sufficiently studied. Therefore the Laboratory of Zoology has begun the study of the specific composition, population, habitat and other bioecological peculiarities of the birds in the aim of attracting several useful species into the orchards and forest areas of Moldavia.

A group of entomologists led by Ya. I. Prints has taken up the task of studying the invertebrate fauna of Moldavia including the predatory (pests in agricultural crops and animal parasites) as well as the useful ones (bees, silkworms, and the predators and parasites of insects and worms) for establishing their composition and habitat and also the morpho-physiological adaptions of insects and worms under the conditions of the medium: resistance of insects to new organic insecticides. They hope to find out what resistance arises when the insecticides are widely used and if there will be any other consequences for such an application.

Great interest is found in the work on the study of the soil fauna which has a marked effect on the soil forming process. They are studying in detail the action of the chemical poisins which are introduced into the soil for the fight again pests on the quantitative and qualitative composition of the macrofauna and microflora. They are studying and improving under production conditions the chemical method of the fight against phylloxera and in particular by using system poisons.

The laboratory of Phytopathology which was set up in mid 1957 has begun a study of the problems in the immunity of agricultural crops (wheat, apples, walnuts, tobacco and tomatoes) to infectious diseases. The director of the Laboratory, D. D. Verderevskiy has worked out the theoretical principles of the natural origin of a specific immunity in plants to parasitic illnesses (mycose and bacteriose). By using the method of individual selection at the infected ground he has created forms of plants which have full immunity to the given diseases or a very high degree of resistance to them. At present the correctness of the theory is being tested on the crops mentioned above. Along with this special attention is being given to research on the immunity of plants to virus infections.

Important theoretical research is being carried out by the chemists of the Affiliate who are participating in solving the general problem of the Academy concerning "the development in the theory of inorganic chemistry and its application in solving the tasks of new technology," and "the chemistry of natural and biologically important compounds."

In the Laboratory of Inorganic Chemistry they are synthesizing the complex compounds of cobalt and are studying their chemical properties, the spectra of absorption and the kinetics of the replacement reaction.

The Laboratory of Organic Chemistry is studying the wastes from the olive oil industry in Moldavia, and in particular the wastes from sage in the aim of extracting the complex substance found in it "sclareol" which is of interest in the synthesis of important perfume products and new drugs. Work on the synthesis from the basis of sclareol has already begun; at the same time they are widely developing the search for other organic compounds which are found in the esters of olive oil. In the near future they will devote a general chemical study to the raw materials and wastes of the food industry of the Republic (wine making, sugar and canning).

The Department of Physics and Mathematics which was organized in mid 1957 at present has been included in the solving of the all-Academy problems of "the physics of solids." A group of researchers who are working on the questions in the theory of F-centers in crystals have taken on the task of theoretically explaining some of the properties of semiconductors. These physicist-experimentalists by using the methods of structural analysis (X-ray and electrographic) are studying the interatom links in a number of crystals; the solution of this question will aid in the solving of the task of industrial manufacturing of substances with definite, pre-assigned properties.

The geologists of the Affiliate are working now on a thorough study of the geological structure of the Republic's territory, its minerals and subterranean waters. One must notice the growing importance of paleontological research in Moldavia which in richness and in the number of varieties of faunas of fossil vertebrates occupies one of the leading places not only in the USSR, but also in the world.

The collective at the Department of Energetics is occupied with a study of the energy reserves of the Republic and with working out the means for their rational use. They are investigating and calculating the hydro-, wind, thermal and other energy resources of Moldavia in the aim of increasing the degree of their use in the energy balance of the rural areas. They are working out the norms for the power load in accordance with the specific conditions of demand for electricity in the Republic. The goal of this research should be to disclose the general system for the electrification of the national economy in the Moldavian SSR. Recently the Department began a new and very interesting prospectus for the creation in one of the Republic's kolkhozes of an experimental bioenergetic unit.

The social sciences play a large role in the development of the national culture of the Moldavian people. The scientific research on the humanitarian cycle has been concentrated in the Insititute of History, Language and Literature.

At present our historians are continuing their work on the general works such as the new edition of the coursebook Istorii Moldavii /The History of Moldavia/, and the first text in the Republic

on the history of Moldavia for high schools. However the center of their attention is given to penetrating monographic research on individual and very important problems in social-economic and political history and the history of social thought in Moldavia. One of the basic directions in the work of the Institute is also the compiling, editing and publishing of historical documents among which one finds in the first place the four-volume edition of the work Krest'yane Moldavii v period kapitalizma /The Moldavian Peasantry in the Period of Capitalism/.

Extensive archeological research is continuing which for a number of years has been conducted jointly by the scientists of the IIMK* of the AN USSR and the IIMK of the Ukrainian Academy of Science. The archeologists are studying the problems of the ethnogenesis of the Moldavian people and the formation and development of the Tripole /Tripol'skiy/, Scythian, early Slavic and ancient Russian cultures on the territory of Moldavia as well as the monuments of the Moldavian Middle Ages, etc.

The linguists of the Affiliate, leaning on the most recent achievements of science in language and in close cooperation with the linguists of Moscow, Leningrad, Kiev and other centers, are doing great work in solving the basic questions in the lexicology, lexicography, morphology and syntax of the Moldavian language. In the current Five-Year Plan they are completing the publishing of the work Kursa sovremennogo moldavskogo literaturnogo yazyka /The Course of the Modern Moldavian Literary Language/ and the compiling of the large Moldavsko-russkiy slovar' /Moldavian-Russian Dictionary/ and a number of other dictionaries (terminological, orthographic, etc.) an atlas of dialects and outlines on the history of the Moldavian language.

The literary writers, proceeding from the general tasks of Soviet literary work, are studying the process of creating artistic realism in Moldavian literature, they are observing the birth and development of the method of socialist realism, and they are finding the inter-relationships and interactions of Moldavian Soviet literature with the literature of the fraternal people and particularly the Russian and Ukrainian. At present they are preparing for publishing the second volume of Ocherki po istorii moldavskoy literatury /Outlines on the History of the Moldavian Literature/ in Russian and the first volume in Russian and Moldavian. They are also continuing work on the editing and publishing of the collected works of Moldavian writers. They are compiling a number of monographs on Moldavian Folklore, ancient Moldavian literature (Dm. Kantemir and others), the classical heritage (V. Aleksandri, I. Kryange, M. Yeminesku and others) and Moldavian Soviet Literature.

It must be pointed out also that with the support of the Republic directing organizations, the Affiliate has systematically expanded the publication of its scientific works. In 1950 the Affiliate published a very limited number of scientific works which took up 80 printed

/*IIMK = Issledovatel'skiy Institut Moldavskoy Kul'tury -- Moldavian Culture Research Institute./

pages, but in 1956 the volume of publsihed works reached 320 printed pages. Among the works which have been published (aside from those which have already been mentioned) one should also note such works as Opredelitel' rasteniy MSSR /Handbook to Plants of the Moldavian SSR/, Derev'ya i kustarniki Moldavii /Trees and Shrubs of Moldavia/, Gidrofauna Dnestra /Hydrofauna of the Dnestr/, Pochvennyye rayony Moldavskoy SSR i ikh sel'skokhozyaystvennyye osobennosti /Soil Regions of the Moldavian SSR and Their Agricultural Peculiarities/, Gruntovyye vody Nizhnego Pridnestrov'ya /Bottom Waters of the Lower Dnestr Area/, and Geologicheskaya struktura tsentral'noy i yuzhnoy Bessarabii /The Geological Structure of Central and Southern Bessarabia/.

The Moldavian Affiliate of the Academy of Science USSR carries on ties with a number of scientific institutions in the lands of people's democracy. Last year a representative from the Institute of History, Language and Literature of the Affiliate, the archeologist G. D. Smirnov visited the Rumanian People's Republic. The study going on there on the materials relating to archeological diggings and the discussion with the Rumanian scientists of mutually interesting problems have aided in deepening our archeological research. In the current year this scientific cooperation is being expanded significantly. We have reached an agreement with the Academy of the Rumanian People's Republic for an exchange of specialists for archeological expeditions by our institutes and the publication of a joint collection of works on Moldavian Mideval archeology.

In 1956 a group of Chinese paleontologists headed by Professor Yan Chunchen visited Moldavia. The guests became acquainted with the deposits of fossil vertebrates in Moldavia and the subjects of paleontological research at the Affiliate. As a result of this visit permanent scientific contacts have been established between the Chinese and Moldavian paleontologists.

For a number of years now the Botanical Garden has been carrying on a regular exchange in seeds and seed catalogs with the botanical gardens of China, Czechoslovakia, Bulgaria, Rumania, Hungary, France, England, Holland and some other countries. It is understood that all of these contacts, and particularly with the scientists of the People's Democracies, should be systematically expanded and deepened.

At present in conjunction with the transitional structure of the management of industry and construction according to a territorial principle and to economic administrative regions, there are new and more responsible tasks before the scientific institutions of the Republic. The Affiliate must expand research for improving technology and the organization of production for fields of the food industry other than viniculture. This work should be concentrated in the sufficiently strong Institute of Chemistry and Chemical Technology. The Affiliate is obliged to give much attention to solving such real tasks in the national economy as the use of local raw materials for producing binding materials, heavy duty concrete, light porous concrete, mineral thermo-isolating materials, ceramic products, the questions of prefabricated

A STUDY OF THE PRODUCTIVE FORCES OF EASTERN SIBERIA

/Following is the translation of an article by V. A. Krotov, in Izvestiya vostochnykh filialov Akademii nauk SSSR, No 8, 1957, pp. 67-74./

The basic problems of scientific research in Eastern Siberia stem from the important role that this economic region of the country plays in the system of national division of labor. This region is becoming the major center for energetics and electric power production, chemistry, ferrous and non-ferrous metallurgy, machine construction, ore extraction, the lumber industry and a rapidly growing agriculture.

The study of the productive forces of Eastern Siberia have assumed an extensive scale essentially only in the postwar years. Prior to the war the level of knowledge of the natural conditions and resources in Eastern Siberia was still not sufficiently high, and the local scientific forces were comparatively poor. The solution to many of the growing questions in the development of the productive forces of Eastern Siberia rests upon the lack of study of the raw materials base, the conditions for the construction of large industrial enterprises, etc. The attention of the scientific institutions of the nation should be attracted to this important matter.

In 1947 when the nation was still healing its wounds caused by the war, upon the initiative of the Irkutskaya oblast' organizations a conference was called of the Academy of Science of the USSR for a study of the productive forces of Irkutskaya oblast'. At the Conference they brought out the goals in the study of the natural resources of the oblast' and stated the means for the most expedient harnessing of the same.

Taking part in the work of the Conference were leading scientists of the nation headed by the Vice-President of the AN USSR, the Academician I. P. Bardin and the Chairman of the Council for the Study of Productive Forces of the AN USSR, the Academician L. D. Shevyakov. The greatest importance of the Conference consisted in that it for the first time gave a general and complex evaluation of the enormous and exceptionally cheap hydroelectric and fuel resources of the Irkutskaya oblast' and determined their leading role in the development of the productive forces of Eastern Siberia. The Conference planned the structure of the Irkutsk-Cheremkhovskiy industrial energy complex and its specialization in electric power and fuel production. The recommendations of the Conference served as the important basis for the drafting of the fifth and sixth Five-Year Plans.

The Conference attracted the Academy of Science USSR, the Moscow State University and many scientific institutions of the nation to a systematic study of the productive forces of Eastern Siberia, and set the basic tasks and directions for further scientific research.

The participants of the Conference unanimously spoke in favor of the necessity for organizing in Irkutsk an Eastern Siberia Affiliate of the Academy of Science USSR for fulfilling the planned scientific research on the problems involved in the development of the productive forces of Eastern Sibera and in the coordination of scientific research which was being conducted in that region.

In February 1949 they passed the resolution of the government of the USSR on the organization of an Eastern Siberian Affiliate of the Academy of Science USSR. The creation in Irkutsk of a major scientific center was the answer to those large questions and demands of life which confronted science in the postwar rapid economic development of Eastern Siberia.

In the past eight years the Eastern Siberian Affiliate of the Academy of Science USSR has grown into a major scientific institution having within it 2 institutes (geology and chemistry) and three departments (biology; energetics; economics and geography) with 12 laboratories. The most recent addition to the Affiliate was the Baykal Limnological Station of the AN USSR, and they have also organized a Buryat-Mongolian group in Ulan-Ude. There are now more than 70 candidates and doctors of science and nearly 200 scientific and technical workers in the Affiliate. Also 47 graduate students /aspirant/ are training in the scientific institutions of the Affiliate.

The process of organizing the Affiliate is still far from complete, and the scientific organizational questions which are involved in such matters as the construction, placement and staffing of the laboratories and equipment and the matter of personnel, occupy a main place in the activity of the Presidium of the Affiliate. This work has taken on particular scope at present since the passage of the government's resolution on the creation of a Siberian Department of the Academy of Science of the USSR, and the construction of major scientific centers in Siberia including Irkutsk. We still must open up a number of institutes and laboratores principally of a technical nature, build the buildings of the institutes and strengthen the scientific personnel.

Simultaneously with the creation of the material and technical base for the laboratories and the training of the cadres, the collective of the Affiliate from the first days of its existence has taken up scientific research on the problems arising out of the needs of the economic development of Eastern Siberia.

The basic region of scientific activity carried on by the Affiliate includes Irkutskaya and Chitinskaya oblasts and the Buryat-Mongolian ASSR /Autonomous Soviet Socialist Republic/. In the other regions of Eastern Siberia the Yakutskaya ASSR is served by the Yakutsk Affiliate of the AN USSR, while the Krasnoyarskiy kray and Tuvinskaya Autonomous Oblast' is covered by the Western Siberian Affiliate of the AN USSR.

The directions in the scientific activity of the Eastern Siberian Affiliate, in accordance with its structure and placement among the other scientific institutions of Eastern Siberia, were determined for the first 10-15 years of its work in the following manner: the study of the geological structure and regular pattern in the placement and formation of the deposits of minerals in Eastern Siberia and also the engineering and geological conditions in connection with industrial and transportation construction; a chemical and technological study of the coal and raw material resources for the metallurgical and chemical industries, and the establishing of the energy resources; a soil and botanical study of the territory with a view to its agricultural utilization; a solution to the questions involved in the physiology and biochemistry of plants; a study of the forests of Eastern Siberia; economic research on the basis for the most advantageous placement and development of industry, agriculture and transportation in Eastern Siberia; and the complex research on Lake Baykal.

Geological Research. In the heart of Eastern Siberia there are concentrated enormous natural riches, but the geological structure of many of the regions is little known as yet. The Institute of Geology in the Affiliate has therefore devoted a basic part of its work to the study of the geological structure and minerals in the most likely regions of Eastern Siberia. They are devoting particular attention to working out the questions involved in the diamond resources of the Siberian plateau. For several years now the geologists from the Institute of Geology under the leadership of M. M. Odintsov have been conducting field research and have compiled geological maps of the diamond bearing regions of Yakutiya and adjacent oblasts. In connection with the problem of the diamond bearing areas, they are studying the trap-rocks of the south-eastern part of the Tungusskiy basin and the Vilyuyskaya depression (V. V. Lyakovich and V. I. Gon'shakova).

They are also studying the geological structure of the southern edge of the Siberian plateau and the depressions of the Transbaykal /Zabaykal'ye/ with the aim of evaluating their perspective oil and gas reserves. N. A. Florensov, Ye. V. Kravchenko and N. A. Logachev are preparing a monograph entitled Mezo-kaynozoyskiye vpadiny blizhnego Pribaykal'ya i Zapadnogo Zabaykal'ya i perspecktivy ikh gasonefte-nosnosti /The Meso-Cenozoic Depressions of Near Byakal Area and the Southern Transbaykal Region and the Perspectives for Their Oil and Gas Reserves/ in which they give an original conception of the tectonic structure and a prognosis of the oil and gas bearing regions of the Cisbaykal and Transbaykal regions.

I. V. Belov and S. A. Bakhromeyev are working on the questions of the metal origins of Western Transbaykal. Ye. V. Pavlovskiy, P. M. Khronov and others are working jointly with the Irkutsk geological administration on a detailed study of the new manganese bearing and rare metal region in the north of the Buryat-Mongolian ASSR.

There is also significant interest in the works on comparative and regional tectonics and particularly on the explanation of the

structure of the depressions of the Baykal type and the Jurassic-Cretaceous sagging which preceeded them; there is also great interest in the problems of seismicity in Eastern Siberia (Ye. V. Pavlovskiy, N. A. Florensov, and A. A. Treskov.)

I. V. Belov has been working on the very unique and complex province of the young vulcanism in the south of Eastern Siberia where he discovered new types and inter-relationships of the neo-volcanic rocks.

The great amount of hydroelectric, industrial and transportation construction in the Angara River area raises important tasks in the field of studying the engineering and geological conditions and hydrogeology. A collective of geologists (Ye. K. Grechishchev, G. B. Pal'shin, N. P. Ladokhin) have concluded a large monograph on the conditions of the transformation of the riparian strip in Lake Baykal in connection with the construction of the Irkutsk Hydroelectric Station. The work of G. B. Pal'shin has been published on the Cenozoic deposits and the earth slippage on the south-eastern shore of Baykal. At present and in direct cooperation with the drafting organizations of the Ministry of Electric Power Stations they are conducting complex engineering-geological and geomorphological research in the region of the Bratsk man-made reservoir. The results of all this research will be widely used for planning the shore-based constructions along the southern coast of Baykal and for solving the questions arising out of the transfer of industrial enterprises and population centers from the flooding zone.

In connection with these same problems of industrial construction and also the development of agriculture a group of scientific workers in the Affiliate under the leadership of V. G. Tkachuk and jointly with the Geological Administration has been studying the subterranean waters on the left bank of the Angara River. They have drawn up the first draft of a hydrogeological map with a scale 1:200000. An abstract of the mineral waters of Buryat-Mongolia is being prepared for printing.

In order to coordinate the geological work of the Affiliate and other organizations, we held conferences on the origin of metals in the southern Transbaykal region and on the subterranean waters of Eastern Siberia. The works of these conferences are presently being printed.

Chemical and Technological Research. It is well known that Eastern Siberia and particularly Irkutskaya oblast' due to the energy resources of the Angara River and the local sources of raw materials is being turned into a major center of the chemical industry in the eastern part of the Soviet Union. Along with this, great importance is given to working out the scientific bases of the chemical industry which is developing in Eastern Siberia particularly the hydrogenation of coal and oil, the chemistry of acetylene, hydrocarbon and simple organic compounds.

In the laboratory of liquid fuel and catalysis (Director I. V. Kalechits) they are studying the products of the hydrogenation of the

tars of Cheremkhovskiy coals; they are also working on methods for the qualified use of phenols and nitrogenous bases which are separated in the process of refining coal. Research has been conducted on the chemism involved in converting very simple aromatic and hydroaromatic hydrocarbons in the presence of various catalysts. They are also studying the regular patterns in the conversion of phenols under the conditions of destructive hydrogenization. The results of this work have been published in two collections of the Trudy /Works/ of the Affiliate.

In the laboratory of organic systhesis under the direction of I. L. Kotlyarevskiy they have worked out methods for using divinylacetylene and the synthesis of valuable gas products which are the wastes of organic production. N. I. Popova is doing research on the scientific bases of the selection of catalysts for the oxidation of propylene and acrolein.

In conjunction with the enterprises and scientific-research institutions of the chemical and oil industry, in 1956 an extensive scientific conference was held on the problems of separating, researching and using phenols and nitrogenous bases.

In the laboratory of inorganic chemistry under the direction of A. L. Tseft and in conjunction with the Mining-Metallurgical Institute they are doing research on the questions of the hydrometallurgy of non-ferrous metals. Here they are working on the hydrochemical methods for reprocessing sulfide ores which provides the complex extraction of non-ferrous, rare and precious metals as well as iron and sulfur in the rough state. Calculations of the expected savings show the possibility of increasing in this way the output of valuable products by two times and of using in the national economy the sulfur and iron which at present are found in industrial wastes. This same laboratory has studied the methods for chemically enriching the low-grade manganese ores of the Buryat-Mongolian ASSR.

One of the most important fields of industrial development in Eastern Siberia is electric energy production and in the first place this involves the aluminum industry. The laboratory of electrometallurgy of the Affiliate under the direction of Ye. I. Khazanov is concerned with research on the most rational methods for refining local raw materials into light metals. Here they are working on the theoretical principles of vacuum metallurgy and the electrothermal processes in the metallurgy of light metals. As a result of chemical and technological research on bauxon and Tatar bauxites, Uzhurskiy nepheline syenite, Kyakhtinskiy sillimanite slate and Onotskiy magnesites and others new effective methods have been proposed for refining these ores.

The laboratory works closely with the geological, planning and scientific research organizations in non-ferrous metallurgy and devotes much attention to coordinating work. In October 1956 it held in conjunction with the Technical Administration of the Ministry of Non-Ferrous Metallurgy in Irkutsk the third coordinating conference which attracted 47 organizations working in the fields of aluminum and titanium-magnesium industry. At the conference they drew up a

coordinating plan for scientific research on the problems involved in creating a metallurgy of light metals on the basis of Eastern Siberian ores. Two collections are now being printed entitled Syr'yevyye resursy legkikh metallov Vostochnoy Sibiri i ikh ispol'zovaniye /The Raw Material Resrouces in Light Metals of Eastern Siberia and Their Use/.

The developing machine building industry and particularly the chemical machinery building and production of mining equipment requires the solution of a number of specific questions involving the study of the nature of breakage of steel under the influence of the low temperatures which are characteristic for Eastern Siberia and under the conditions of chemical production where the steel comes under the protracted action of a hydrogen atmosphere, high temperatures and pressure. The laboratory of metal working of the Affiliate under the direction of K. V. Popov is conducting in conjunction with the branch scientific research institutes of the chemical and oil machinery industry work on the problems of the durability of steel. They have found new data on the nature of steel breakage in connection with the phenomena of cold shortness. Research on the influence of heat treatment on the cold shortness of steel has interested the Noril'skiy Mining and Metallurgical Combine, and they have begun to work jointly with the Affiliate laboratory.

In Eastern Siberia along with the hydroelectrical resourses there are concentrated enormous reserves of hard and brown coals on the basis of which there is now developing a powerful energetics and chemical-coal industry. In the next few years we must create coke-chemical production for a future ferrous metal industry. In line with this there is important significance in the research on the power properties and the coking capacity of the coals of Eastern Siberia and the methods for using small coal fragments; this work is being conducted by the department of energetics of the Affiliate under the direction of A. L. Perepelitsa. In the process of mining coal and partiularly by the open pit method there is about 40% fines which are not usable in the ordinary furnaces. In the department of energetics they have worked out a method for torch-layer combustion of fuel by using a pneumogrist; this enabled them to use the fines and it raised by 1½ times the steam productivity of the boilers and lowered the pollution of the air with ashes and soot. This method is being tested at the Cheremkhovskiy factory for Semicoking and at the Cheremkhovskiy Thermal Electric Station, and in addition in the boiler room of the Usol'skaya Match Factory "Baykal." They have also established the possibility of making briquettes from coal fines by using the tars and heavy coal-tar products from semi-coking as binding agents. They are working out a new method of pyrogenetic coking of the local hard coals by which they get a smokeless coking fuel.

They are also stddying the possibility of using for the coals from the Irkutsk basin a new technology for coking (the method of L. M. Sapozhnikov) which is particularly important in relation to the proposed construction in the Krasnoyarskiy kray and in Irkutskaya

oblast' of major metallurgical combines. The goals of the research on heat conversion and semi-coking of coal fines and its effective combustion is given in the published collection Polukoksovaniye ugley Vostochnoy Sibiri /Semi-coking of the Coals of Eastern Siberia/.

Biological Research. The basic works which are going on in the Eastern Siberian Affiliate of the AN USSR in the field of biology are concerned with the solution to scientific problems in the development of agriculture and forestry in Eastern Siberia. A plan for scientific research on agricultural matters was drawn up in the aim of coordinating the work and directing the efforts of the scientists in solving the most pressing questions in this field.

In accordance with this plan the Department of Biology of the Affiliate is studying the soil covering and is drawing up a soil map of the Ust'-Ordynskiy and Buryat-Mongolian national okrug which is the most important region for conquering the virgin lands in Irkutskaya oblast'. Under the direction of B. V. Nadezhdin they have compiled a map of the Alarsko-Nukutskiy, Osinskiy and Bokhanskiy rayons on a scale of 1:200000. At the same time they have given an evalutation of the earths which are suitable for tilling. In these same rayons under the direction of L. I. Nomokonov they are making a study of the vegetation and are drawing up geobotanical maps in the aim of evaluating the feed resourses for livestock.

Such a work has already been completed earlier on the 11 southern aymak /districts/ of the Buryat-Mongolian ASSR under the direction of M. A. Reshchikov. In the same area they are studying the means for increasing the productivity of irrigated meadows.

The large monograph of L. I. Nomokonov on the river meadows of the Yenisey has been prepared for publishing. They have already finished the research on the river meadows of the Lena within the limits of Irkutskaya oblast' and the meadow vegetation along the course of the Lena railroad.

Of particular scientific importance is the principal two-volume work of the now deceased M. G. Popov entitled Flora Sredney Sibiri /The Flora of Central Siberia/; this work won the prize of the Presidium of the AN USSR for 1956. The first volume of this work has already been published and the second will come out in 1957.

Under the direction of F. E. Reymers they are conducting physiological and biochemical research on the growth and development of various types of corn under the conditions of Irkutskaya oblast' in the hope of producing mature corn seed. In 1955 and particularly in 1956 at experimental stations and as well under field conditions they had positive results in this and they have shown the way for creating a local growing of corn seed. They are also studying the winter resistance of clover and alfalfa as well as the growth and development of biennial vegetables under local conditions. A study of the growth and adaptability to low temperatures of cabbage and tomato seedlings has led to the recommendation of a method for growing seedlings by sharply cutting down on the use of hothouse frames.

The proposals made on this question have been sent out to a number of kolkhozes in the oblast' for experimental tests and introduction. The monograph of F. E. Reymers on the physiology of the growth and development of cultivated herbaceous plants of biennials and perennials is being published.

The Prize of the Presidium of the Academy of Science USSR was awarded to the work of G. I. Galaziy on the vertical limits of ligneous vegetation in the Khamar-Dabana Mountains which has thrown light on the questions of the changes in the climatic conditions of Eastern Siberia. G. I. Galaziy has proposed the use of a botanical method (the study of the annual rings of trees which are growing on shores) for determining the date of the high historical water level in Lake Baykal, and this will allow one to establish the fluctuations in the lake level in the long periods when there were no hydrological observations.

The Forestry Laboratory is devoting its basic attention to research on the conditions of natural reforestation of the pines and cedars. A group of entomologists is studying the biology of the Siberian silkworm and the measures for the fight against it, and also (jointly with the Zoological Institute of AN USSR) the biology of the electric ray [gnus]; they have proposed methods for the struggle against the ray which are being tested extensively in the region of the construction of the Bratsk Hydroelectric Station.

Economic Research. The Department of Economics and Georgraphy of the Affiliate is now taking up the questions of placing agriculture and agricultural divisioning into rayons (the directors, V. N. Shertoboyev and V. P. Shotskiy). They have worked out a system for dividing agriculture into rayons which has been approved by the Oblast' Executive Committee and which has been given to the rayon organizations for review. The co-workers of the Department are studying the economics of the kolkhozes in the Bokhanskiy rayon and also the agricultural possibilities of the Angara-Ilim group of rayons. Along with the Department of Biology they are preparing for publication a collection of works devoted to the description of the nature and management of the Bratsk industrial complex. They have finished the research on the possibilities for the complex use of the forest resources in the heavily forested regions of Eastern Siberia (V. S. Belousov) and in addition the development and placement of the coal industry in Irkutskaya oblast' and in the Transbaykal area. They are now preparing for publishing and have partially published the outlines of the economic geography of Eastern Siberia and its individual parts (V. A. Krotov, B. R. Buyantuyev).

The Department participates in the work of the Buryat-Mongolian and Transbaykal complex expeditions of the Council for the Study of the Productive Forces of the AN USSR . The results of the work are published in the collected works Materialy po izucheniyu proizvoditel'nykh sil Buryat-Mongol'skoy ASSR /Materials on the Study of the Productive Forces of the Buryat-Mongolian ASSR/ which is being published jointly with the SOPS of the AN USSR. Volume II has already been published and volume III is being printed.

Research on Baykal. A special place in the subjects of scientific work done by the Affiliate is given to complex research on Lake Baykal; the task here is to study the nature of this remarkable body of water. This research has been going on now for more than 25 years under the auspices of the Baykal Limnological Station which was founded in the village of Listvennichnyy in 1928 under the direction of the now deceased G. Yu. Vereshchagin.

The works of the Station (15 volumes have been published) are widely known. In 1953 the Station was included in the scientific institutions of the Eastern Siberian Affiliate of the AN USSR. It is doing work on the study of heat exchange, the thermal, ice and hydrochemical regimes of Lake Baykal as well as the inter-relationships with the Angara River. This work is not only of great theoretical significance but also important for the construction and exploitation of the cascades of the Angara Hydroelectric Stations.

From the results of the works of the Station they have published or are now publishing large monographs such as D. N. Taliyev's work on the gobies of Lake Baykal, L. L. Rossolimo's work on the thermal regime of the lake, G. G. Martinsons's work on the fossils of freshwater mollusks, and the work of a group of authors (A. Ya. Bazikalova and others) devoted to a complex description of the Little Sea /Maloye More/.

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Naturally in spite of all the scientific and practical significance of the research which the Affiliate is engaged upon its own forces encompass only a small part of the scientific problems related to the study and harnessing of the natural wealth and the development of the productive forces of Eastern Siberia. A large part of the work is being carried out by the VUZes of Irkutsk and other towns in Eastern Siberia, by expeditions of the central institutes and the Council on the Study of the Productive Forces of the AN USSR, Moscow University, a number of branch scientific and planning institutions and geological organizations.

The coordination of all this research in the aim of a proper arrangement and use of the scientific forces is a most important task of the Affiliate, but as yet it is being carried out with insufficient energy.

They have set up a Coordinating Council under the Affiliate which will review the subject plans for the works in geology, coal industry and chemistry. They have held three sessions on the problems of agriculture. A great role in the coordination of biological research was played by the travelling session of the Department of Biological Sciences of the AN USSR which was organized jointly with the VSFAN* and the Department of Agriculture and Forestry from the All-Union Academy of Agricultural Sciences Imeni V. I. Lenin; it was held in the summer of 1957. Similar conferences were held also in the Institute of Geology in the Affiliate, in the laboratory of electro-

/*VSFAN = Eastern Siberian Affiliate of the AN USSR./

metallurgy and others.

At present the Eastern Siberian Affiliate of the AN USSR jointly with the Council on the Study of the Productive Forces of the AN USSR is preparing for a conference on the development of the productive forces of Eastern Siberia which is intended to take place in 1958 with the participation of all the scientific institutions, Sovnarkhozes, planning organs, local Soviet, Party and economic organs from Krasnoyarskiy kray, Irkutskaya oblast', Tuvinskaya autonomous oblast', Chitinskaya oblast', the Buryat-Mongolian ASSR and the Yakutskaya ASSR. This conference should lay down the goals of scientific reseach for the study of the natural conditions and resources of Eastern Siberia so that on the basis of this conference we can arrive at an economic evaluation of these resources and establish their rational use in accordance with the tasks laid down at the 20th Congress of the CPSU. We must also lay down the goals of economic development for Eastern Siberia, disclose the existing difficulties and disproportions between the individual fields and regions [rayon], and plan the means for their further growth which will provide the complexity and correct specialization , shorten long distance transhipping, and bring about the correct placement of the productive forces. The conference should give the materials for the perspective plan of economic development in Eastern Siberia. We must also draw up a coordinating plan for scientific research 15-20 years hence.

Life confronts scientists with a number of major scientific problems related to the most rapid harnessing of the great natural wealth of Eastern Siberia. The rapid development of the productive forces of the nation's eastern regions in accordance with the resolutions of the 20th Party Congress demands also a corresponding scale of scientific work.

AN OUTPOST OF SCIENCE IN THE FAR EAST

/Following is the translation of an article by. V. G. Bykov, V. M. Mayorov and A. V. Stotsenko in Izvestiya vostochnykh filialov Akademii nauk SSR, No 8, 1957, pp. 75-79./

After the victory of the Great October Socialist Revolution, the advanced scientists of the nation in striving to place science in the service of the liberated people began to seek the most rational organizational forms for a thorough study of the natural resources and productive forces of our Motherland. Right up to the '30s such work was conducted principally by sending expeditions from the central institutes of the Academy of Science of the USSR to the location. In spite of all the merit of such expeditionary research they could not however satisfy the demands of a rapidly growing economy and culture in the rayons which were removed from the center. Life required that scientific research be raised to a higher level. From drawing up inventories and descriptions of the nature of the krays and oblasts which was the primary goal of the expeditions from the Academy of Science it was necessary to make a transition to a penetrating study of the internal processes and regular patterns of development which were going on in the area. Such tasks could be fulfilled only by sufficiently powerful scientific institutions of the Academy of Science USSR located on the spot.

The Academician V. L. Komarov took upon himself the responsibility for raising the question of the necessity of organizing such scientific institutions in the Far East; Komarov had devoted many years of his life to the study of the nature of our kray. For several years he consequently propagandized this idea and led the struggle with the conservative circles in the Academy. This idea was strongly supported by all of the Far-Eastern organizations and the Central Committee of our Party. In the summer of 1932 in Vladivostok the Far-Eastern Affiliate of the Academy of Science of the USSR was opened; V. L. Komarov became its first chairman.

In the 25 years of its existence the Far-Eastern Affiliate has followed a complex and contraditory course of development. During this course there was the period when due to the military danger created by the imperialists in the Far East the work of the Affiliate was sharply curtailed, its extensive and valuable collections and equipment were moved into the center of the land, and a large part of its scientific co-workers were transferred to other scientific institutions in the

AN USSR. During the war years only the Mining and Siberian Forest Station of the Affiliate continued to function in a limited capacity. However in 1944 there began a gradual upswing for the Affiliate and on its 25th anniversary it was operating as a powerfu complex scientific institution capable of independently solving many scientific questions.

Now the Affiliate has working within it more than 130 scientific co-workers including 5 doctors and 42 candidates of science who are conducting research in the various fields of geology, chemistry, water control problems, biology, biochemistry and plant physiology, economics, history and archeology.

In the 25 years of its activity the scientific collective of the Affiliate has conducted important research the results of which have rapidly become part of the modern knowledge on the natural resources of the Far East and are widely used in the national economy. The research of the scientists of the Affiliate encompasses the extensive territory from the southern Transbaykal area to the Kurile Islands and Kamchatka.

The geologists from the Affiliate have introduced a significant addition to the knowledge of the regular patterns of placement for the minerals in the territory of the Far East. The works of G. P. Volorovich, N. I. Ivantishin, F. K. Shipulin, I. N. Govorov and others have given the perspective directions for finding the polymetallic ores in the Primorskiy kray [Maritime prov], and now this kray has the nation's richest deposits of tin, lead, zinc and a number of other non-ferrous and rare metals. As a result of the studies by the geologists of the Affiliate on the sedimentary rocks of the Maritime Province the perspectives for the Suchanskiy hard coal basin have been expanded and the scientific bases have been given for the perspectives on the bauxite and oil deposits in the south of the Far East.

The Affiliate's chemists have conducted much interesting research which is important for its theoretical aspects and valuable from the point of view of knowing the rich mineral resources of the Far East. First of all one should mention the outstanding work of the present Corresponding Member of the AN USSR, I. N. Plaksin, on research in the gold-mercury system. V. T. Bykov did a general study of the structure and sorbtive features of the natural sorbents of the Far East and separated from among them those which in their bleaching properties come close to the best known forms. A group of chemists has published a monograph in which they give a detailed chemico-physical description of the Lipovets coals and have shown the possibilities for producing various liquid chemcial products and gas from them.

The chemists have also made a contribution to the study of the wild plants of the Far East. Along with their great applied significance the works of Yu. V. Branke, D. A. Balandin and I. F. Belikov have solved the theoretical questions involved in the biosynthesis of plants under the influence of the environment and they have explained the role of alkaloids in the life of plants. Diplomas from the

All-Union Chemical Society Imeni D. I. Mendeleyev have been awarded to the work of Ye. P. Ozhigov in the field of nuclear periodicity and to M. A. Mikhaylov for his work on the interaction of superheated steam with the fluorides of metals from the second group of the Mendeleyev periodic table. This last work has opened the prospect of extracting boron from the rich Maritime deposits of datolite on the basis of a new technology.

In 1951 the Affiliate organized the department of hydroenergetics and water control. A thorough study of the local physical-geographical conditions permitted A. V. Stoisenko and V. G. Chernenko and others to work out the basic principles of hydroelectric construction under the conditions of the Far East (and in mountainous countries in general); these principles are basically different from those usedat present in the West of the USSR. On the basis of these principles they were further able to compile and give the economic basis for the main system for carrying out the engineering struggle with floods and the complex use of the water resources of the Maritime Province, the south of Khabarovskiy kray and the Amurskaya oblast'. The solution of the department was approved and on the instruction of the USSR Gosplan a planning organization was sent to prospect in the aim of building the firstpowerful hydroelectric station in the Maritime Province on the Ulakhe River. The department is conducting interesting work also in the field of controlling freezing.

The biological sciences have received the greatest scope and development in the Affiliate. The results of the numerous expeditionary, laboratory and experimental research done by the biologists is found in the 79 books pamphlets and other publications of the Affiliate, and also in many scientific articles which have been published over this time in the journals of the Academy of Science USSR and of various departments /vedomstvo/.

The soil experts M. A. Zhukova, A. V. Mizerov and G. I. Ivanov have at various times done research on the soils and soil erosion processes in the southern Maritime Province particularly in the mountainous regions. These works are widely used in agriculture for drawing up plans for land usage in the kolkhozes and sovkhozes of the kray.

The botanists of the Affiliate for 25 years have covered in their research in essence almost all of the territory of the Soviet Far East. They have published a number of outlines on the vegetation of the investigated regions which in many instances are the sole sources for botanical knowledge on these localities. The handbook of plants of the Far East of V. L. Komarov and Ye. N. Klobukova has to now served as the reference book not only for specialists in botony but also for the workers in forestry and agriculture, teachers and horticulturists. As a result of the research on the flora and vegetation of the Far East conducted by N. Ye. Kabanov, D. P. Vorob'yev, G. E. Kurentsova, P. D. Yaroshenko and other co-workers in the Affiliate, they have drawn up botanical maps and vegetation maps for the Far East and have made collections of the extensive group of useful

plants. As a result our remote kray has become one of the most studied regions of the country. The study by L. N. Vasil'yeva and other micologists on the lower plants has served as the scientific basis for working out the struggle with fungous diseases in agricultural crops, for evolving measures for clearing reservoirs of harmful algae and the use of lower plants in farming.

Among the zoological research of the Affiliate which takes in the various groups of animals for almost all of the vast territory of the Far East, one first must mention the works of A. I. Kurentsov who has devoted his life to a study of the Far-Eastern predatory insects. His works in this field and also on the general theoretical questions of zoology and zoogeography for the kray have been highly valued among the scientists of our nation as well as the workers in forestry and agriculture. The Affiliate's zoologists L. M. Shul'pin, A. A. Yemel'yanov, N. G. Zolotarev, K. A. Vorob'yev, P. G. Oshmarin, G. F. Bromley, Z. G. Onisimova and others have published a number of research works which give together a complete picture of the fauna of the Far East and the recommendations for its use in the economy.

In recent years the laboratories of physiology and biochemistry have begun to turn to research on the internal processes in the lives of plants and their connections with the surrounding conditions. This is the work of I. M. Vasil'yev, V. A. Tyrina and Ye. D. Taleysnik on the physiology of plants' resistance to winter, the work of Ye. I. Komizerko. V. G. Reyfman and V. Ye. Kosmakova on the nature of the rust spots in potatoes and on the reasons for the degeneration of the potato under the conditions of the Maritime Province. The physiologists of the Affiliate ever more often are beginning to use in their research radioactive isotopes, "marked atoms," etc. which permit them to be acquainted with the phenomena in the internal life processes of the organism which up to now have been inaccessible.

The Affiliate has been conducting a broad study on the medicinal plants of the Far East such as the lemon /limonnika/ and particularly gentium. The botanists Z. I. Gutnikova, P. P. Vorob'yeva, I. A. Bunkinova and others at the experimental plantations of gentium in the Affiliate have shown the possibility of growing the roots of this plant under cultivation in the Maritime Province under the cover of the forests as well under artificial shade.

Research done by the chemists and pharmacologists has shown that the cultivated roots of gentium in the medicinal properties that they have do not differ from the wild roots.

I. N. Maydenova has separated from the extract of gentium stable crystals which have a marked tonicizing and stimulating action on an organism. It is possible that the study of the chemical composition of the crystal will permit in the future the synthetic manufacturing of a most valuable medicine.

Work in the field of social sciences was begun later than the rest in the Affiliate. Up to now the economists have accumulated extensive material on the condition and perspective development of the

basic industrial fields in the Maritime Province and in other regions of the Far East.

In 1954 the Affiliate's department of history and archeology was organized. Its co-workers are searching for and studying the material remains of the ancient and middle history of the Far East which in our kray are not any poorer than the natural resources. The workers of the department in gathering around itself all of the historians of the Far East are studying the history of the conquering of the kray by the Russian people, the ethnography of the local populace and the history of the struggle of the workers for Soviet power and the construction of socialism.

In the 25 years of its existence the Far-Eastern Affiliate of the AN USSR has published 159 books and pamphlets which cover almost 1200 printed pages. Some of these works have been awarded high all-Union prizes. Thus the Stalin Prize was won for the works of G. P. Volorovich and A. I. Kurentsov which were completed at the Affiliate; 6 works have received the Prize of the Presidium of the Academy of Science USSR, and 3 works have been given the prizes and diplomas from the All-Union Chemical Society Imeni D. I. Mendeleyev.

The Affiliate has become a solid forge for the scientific personnel of the Far East. In the last 5 years 24 persons have been receiving their graduate training in the Affiliate; among these 15 have continued without interrupting their jobs. Forty-seven specialists of the Far East have successfuly defended their dissertations in the Affiliate, and they have won the scientific degree of Candidate of Science; included in this are 26 in biological sciences, 7 in agriculture, 13 in technical and 1 in geological-mineralogical sciences.

In recent years the Far-Eastern Affiliate of the AN USSR has begun to establish fraternal scientific ties with the scientists of China and Korea. In 1956-1957 V. T. Bykov, A. V. Stotsenko. A. I. Kurentsov, M. G. Organov, P. D. Yaroshenko and other scientists from the Affiliate visited the Chinese People's Republic. At the same time the Affiliate welcomed the Chinese scientists, Chzhu Ke-Chuen (Vice-President of the Chines Academy of Science), Sun Da-Chen, Chzhu Dze-Fan, Lu Tszu-chzhu, Fun Tszi-lan', U Chuan'-dyun and others.

V. T. Bykov, I. F. Belikov, D. P. Vorob'yev and others visited the Korean People's Democratic Republic. During the same year the Scientific Secretary of the Korean Academy of Science, Tyan Dyu Ik became acquainted with the Affiliate and its work.

The mutual visits and the friendly exchange of plans and opinions permitted the scientists of the Affiliate and the neighboring People's Democracies to establish common problems in the development of the scientific research on the nature of the Far East and to plan for some joint works. In 1957 a group of geologists from the Affiliate has already begun field prospecting in the Maritime regions of the Chinese People's Republic which are adjacent to the Soviet area. In their turn a group of Chinese geologists are working on research on Soviet territory. Analogous works are being carried out by the soil experts,

botanists, forestry experts and other specialists from one or another side. Soviet and Chinese specialists in the field of water control are jointly drawing up a system of water control measures in the basin of the Ussura River.

The successes which the scientists of the Affiliate have attained are unquestionable. However the existing structure of the Affiliate impedes the further development of scientific research and cannot properly provide for an increase in its theoretical level and for the most rapid application of science in the needs of industry and agriculture.

Therefore the Presidium of the AN USSR in a recent enactment entitled "On the Condition and Further Development of the Far-Eastern Affiliate of the Academy of Science USSR" envisaged the organization within the Affiliate of geological, biological and chemical institutes.

The necessity has arisen of creating institutes and stations of the Affiliate in the Khabarovskiy kray, and the Amurskaya, Magadanskaya and Kamchatskaya oblasts. Here scientific research is still being conducted by visiting expeditions from the Affiliate and from the head institutes of the AN USSR; now this is patently insufficient.

We are hopeful that the Presidium of the Academy of Science USSR and its Siberian Department will assign the basic personnel from the numerous expeditions of the Academy to permanent work in the Far-Eastern regions.

In the resolutions of the 20th Party Congress and in the subsequent resolutions of the Central Committee of the CPSU, it was emphasized that it is necessary to bring the scientific institutions close to the objects of research and to the practice of socialist construction. The creation of a branched network of scientific institutions under the Academy of Science USSR in the Far East and the strengthening of the Far-Eastern Affiliate are the necessary conditions for fulfilling this directive of the Party.

We must strengthen the training of young personnel in the sciences through graduate study in the Affiliate and also by sending the graduate students from the Far East on training missions to the head institutes of the Academy of Science USSR.

The realization of these organizational measures will have, undoubtedly, positive influence on the further development of scientific research on the rich natural resources of the kray, and on the scientific solution for the methods and means of the resources' use for the well-being of the peoples of our beloved Motherland.

ON THE ACTIVITY OF THE YAKUTSK AFFILIATE OF THE AN USSR

/Following is the translation of an article by N. V. Cherskiy in Izvestiya vostochnykh filialov Akademii nauk SSSR, No 8, 1957, pp. 80-85./

In the large family of Affiliates of the Academy of Science USSR which this year is celebrating its 25th anniversary, the Yakutsk Affiliate (YaFAN) is one of the youngest.

All of ten years have passed since its organization (for the first two years the scientific Academy center in Yakutiya was called a base). In this short time the Affiliate has grown rapidly and expanded the scope of its activity. In 1949, when the Yakutsk base of the AN USSR was renamed an Affiliate, it was made up of one institute and three departments with 150 persons in the general number of workers. But today in the three institutes and other subdivisions of the Affiliate there are more than 300 persons at work. In the last ten years we have published 330 scientific works in the form of collections, articles and monographs which cover 1600 printed sheets. From among the co-workers of the Affiliate, 4 have received the scientific degree of doctor of science, and 12 have become candidates of science. At the beginning of 1957 the YaFAN had 8 doctors of science and 42 candidates of science.

The basic directions of the Affiliate's activity are first of all geological research and the study of minerals, and then work in biology (physiology of plants under low temperatures, the pelt industry and others) and in the field of the humanities. In connection with the great amount of work going on in our country on the program of the IGY the work of the laboratory for cosmic ray studies in the Affiliate takes on special importance.

In the field of geology over the past years we have significantly strengthened the research on the mineral wealth of the Republic.

The first work in this field was the outline of I. S. Rudnik on the origins of iron in the Yakutskaya ASSR (1949) which laid the basis for the organization of prospecting for the iron ore deposits in the region of Chul'man. In the same area within the limits of the Aldanskiy shield /shchit/, the Affiliate's workers Ye. M. Tsyganov and I. D. Belyayeva in 1952-1954 carried out research on the iron reserves of its northern periphery; the research showed that the iron ore potentials were not great and the region at present does not merit special prospecting for iron.

Beginning in 1953 the sphere of work in the constantly growing collective of geologists in the YaFAN has gradually encompassed the extensive territory of the north-eastern, western and central areas of Yakutiya, with their rich mineral and raw material resources.

In 1955 A. S. Kashirtsev finished an analysis of the stratigraphic separations of the Permian deposits in Western Verkhoyan'ye; this work, based on paleontological principles, received recognition from the majority of geologists. He has compiled a field atlas of the Permian fauna which has been distributed to the geological organizations of the Republic and it will serve as a practical aid in field work. Of significant scientific interest is the first tectonic system of the Western Verkhoyansk anticline which A. V. Vikhtert has worked out from the data of a structural-phase analysis. In both of these works there is valuable material on the gas and oil resources of the Verkhoyansk area.

Among the most interesting and important geological works one must also bring in the general collection of materials on the polymetalic mineralization of the north-eastern part of Yakutiya and the compilation of a working version of the map on the metalogenic areas of this oblast' on geotectonic principles. The map was drawn up by the co-workers of the Affiliate under the general direction of Yu. P. Ivensen and with the participation of the geologists from the other organizations of the Republic. First it notes the regular patterns in the distribution of non-ferrous and rare metals in the territory, and aids the prospectors to gain a correct orientation for seeking the deposits of minerals. In the near future this work will be completed and this should provide with great accuracy a prognosis for the areas of non-ferrous and rare metal mineralization.

In 1956 for the first time the YaFAN began research on the geology of the indigenous deposits of diamonds, fuels and mineral construction materials.

A group of specialists headed by L. N. Leont'ev has undertaken an elucidation of the genesis of the diamond-bearing kimberlites. The Yakutsk kimberlite veins in their great variety of geological conditions of occurrence are markedly different from the extremely uniform geological position of the same such veins in Africa. Therefore they are unique material for determining the questions of the origins of diamonds and their matrix. On the basis of the data which we have already obtained we have made a preliminary conclusion that the kimberlites are not related to the ultrabasic rocks from great depths, but with the derivaties of the ordinary trappean (basalt) magmatic fusion. For strengthening this research which is of great theoretical and economic importance, the Affiliate has created a sector of diamond geology (A. A. Menyaylov, Director). The work in this field is being carried out in cooperation with the production organizations and with the geological museum imeni the Academician A. P. Karpinskiy.

Along with the various forms of geological research in the west of the Republic they are developing research which is signficant in

its scope on such topics as soil conditions, agricultural economics, transportation and energetics. This research in the aggregate should provide a general scheme for the development for the sparsely populated new diamond bearing regions of Yakutiya which are comparatively difficult to develop.

The realization of this varied and integrated research and the compilation of a technical and economic report on the development of the productive forces on the base of the diamond extracting industry has been turned over to the Complex Expedition of the YaFAN which was transferred there in 1956 from the system of SOPS /Council on Harnessing the Productive Forces/ of the AN USSR.

In line with the tasks involved in the creation of a fuel base for the Republic, the geologists of the Affiliate in 1956 compiled a resume on the coals from the central regions of Yakutiya in which they gave the geological reserves of this major carboniferous province which are numbered in the thousands of millions of tons; it also has some material on the prediction of new coal deposits (N. A. Ignatchenko and others).

A. V. Aleksandrov has begun a study of the upper Paleozoic coals in the basin of the upper channel of the Vilyuy River which, judging from first preliminary surveys, may have deposits of industrial importance.

A group of geologists is studying the geological structure and the prospects for gas and oil deposits in the northern slope of the Baykal folded zone (A. K. Bobrov) and the territory of the so-called Kempendyayskiy rises in the south of the Vilyuy syneclisis/sinekliza/ (F. S. Fradkin). On the southern slope of the Anabarskiy shield they are also doing research on the oil and gas possibilities and a chemical analysis of the subterranean waters (A. I. Kosolapov).

In the regions which will be included in the future center of the diamond mining industry they have begun research on the mineral construction materials (T. I. Anodin); the final aim of this work is the compilation of a prospectus for finding these minerals in Western Yakutiya.

In 1957, all of the geological subdivisions of the Affiliate were united in the Institute of Geology of the YaFAN. In the Institute are sectors of diamond geology, mineral fuels, non-metallic minerals, stratigraphy, tectonics and litology, ore deposits and metallogenesis, and also an analytical laboratory.

At present 80 co-workers are in the Institute of Geology. Such a number for solving the tasks confronting the Affiliate in the field of geological research is clearly insufficient. Thus in the sector on diamond geology there is a total of 7 workers when there should be a minimum of 20; in the sector of non-metallic minerals 5 people are at work when they need 12-15; some of the others are a bit better off, but part of them still do not have directors.

In addition to the analytical laboratory which is concerned with determining the chemical composition of the minerals and with spectral analyses, there are also the following bureaus /kabinet/ in

the sectors of the Institute: the bureau for determining the absolute growth of ores by the potassium-argon method; a bureau of coal chemistry which is working on technical and element analysis in coals and a few other identifications; and also a bureau for analyzing oil gases. These facilities do not satisfy the needs and requirements of the geologists and a significant part of the analyses daily must be sent to the laboratores in the central institutes of the AN USSR; incidentally these institutes undertake such requests unwillingly.

The geologists of the Yakutsk Affiliate are strengthening their ties with production. They are working closely with the geophysicists of the Eastern Siberian Expedition of the Ministry of Geology and Preservation of Minerals on geological research in the territory of the Anabarskiy shield. In conjunction with the enterprises of the Yakutsk Sovnarkhoz the specialists of the Affiliate are studying the Permian deposits in the region of Allakh-Yunya. Work is being planned for 1958 on a joint thematic work with the recently organized Yakutsk Geological Administration.

The most pressing and necessary tasks of the Institute of Geology of the YaFAN are the creation of modern laboratory facilities, the strengthening of the sectors with skilled personnel, the expansion of research on a number of problem which have great theoretical and economic importance (diamonds, polymetals, rare and scattered elements, construction materials, etc.).

In this jubilee year the collective of the laboratory for the study of cosmic rays is greeted with great successes. In 10 years this laboratory has grown from a small group of researchers into a major scientific subdivision which is equipped with the most advanced technology. This laboratory, headed by Yu. G. Shafer, is participating in the broad range of research being carried out under the IGY program. Its specialists (A. I. Kuz'min, D. D. Krasil'nikov and others) are constantly registering the intesity of the cosmic rays and are studying the connection between this intensity and the activity of the sun; they are also doing work on meteorological and other geophysical phenomena. At present the laboratory is concluding the creation of new experimental equipment of unique construction, and it is studying the polar radiations in the city of Yakutsk and in Bukhta Tiksi [Gulf Tiksi]. It is also beginning research on the intensity of cosmic rays in the stratosphere and the recording of their neutron components. All of this work is going on according to a single plan and in close contact with all of the other organizationsin the field within the Soviet Union and is being coordinated by the Physical Institute Imeni P. N. Lebedev of the AN USSR.

The Department of Economics and Geography of the YaFAN is completing a multi-year project on the net costs of production in the Republic's kolkhozes, on the layout of land, on the proper creation of the fields of kolkhoz production and on some other questions in the economics of agriculture. The study of these problems will be transferred to a special scientific-research institute of the Ministry of

Agriculture of the RSFSR which was organized in Yakutsk in 1956.

The economists of the Affiliate have been switching over now to more pressing industrial studies for the development of the productive forces of the Yakutsk Republic which is closely linked with its industrialization and above all with the growth and expansion of the ore extracting industry.

In this area they have already carried out intensive research on the economic geography of Southern Yakutiya (I. K. Yefimov), the economics of the diamond bearing regions in the Vilyuy River basin (G. V. Naumov) and capital construction in the Yakutsk ASSR (G. M. Chudinov). One must point out that in their work the Department of Economics and Geography of the YaFAN is far removed from the needs and problems of the Republic's national economy. The staffing of the Department with skilled specialists in the area of industrial and transportation economics is a primary and immediate task of the Affiliate.

The already mentioned Yakutsk Complex Expedition of the Affiliate has been destined to play a large role in the development of the productive forces of the Yakutsk ASSR. The main task of this subdivision which is headed by L. N. Leont'yev as established by the Presidium of the AN USSR is to solve the problems involved in "The natural conditions, resources and complex development of the productive forces of Western Yakutiya in connection with the commerical exploitation of the diamonds and other valuable minerals." By the end of the Sixth Five-Year Plan the research on this problem should be completed in the form of a corresponding technical-economic report which will be presented to the Union government. The first and preliminary draft of this report will be compiled earlier, that is, in the first half of 1958. More than 20 departments are to work within the Expedition and they will study various questions of geology, mining, economics, energetics, transportation and agriculture. A part of these departments will be staffed along with the workers from the YaFAN by specialists from the central institutes of the AN USSR. From among the already completed research of the Yakutsk Complex Expedition it is worth mentioning the economic basis for the commercial working of the rock salt deposits for solving the problem of supplying salt to the Far East (G. K. Kondakov).

Of great theoretical interest and practical significance is the elucidation of the genesis of the kimberlites; this work was begun in 1956 by L. N. Leont'yev, A. A. Kandenskiy and A. A. Menyaylov. It will be hoped that this research will successfully settle once and for all the moot question of the formation of the kimberlites and the diamonds which it contains.

One of the major subdivisions of the Yakutsk Affiliate is the Institute of Biology which has been in existence since 1952. Within this Institute are laboratories of biochemistry, plant physiology, microbiology and sectors of zoology, soil mechanics, and botany. They are conducting experimental work at the Chuchur-Muranskaya Biological Station which is located 7 km. from Yakutsk. In the Institute are 67 co-workers including 3 doctors of science and 19 candidates of science.

In the years past the Institute of Biology has done much work in the study of animal husbandry in Yakutiya (Ya. L. Glemobotskiy and S. N. Popov), the results of which are of undoubted value for the agriculture of the Republic. A significant contribution in the study on animal acclimatization has been made by the working out of the methods for reacclimatizing sables in Yakutiya (V. A. Tavrovskiy and others); this work was finished by the sector of zoology in 1956. This work was carried out jointly with the Republic Administration for Animal Trapping and the Administration for Consumer Cooperatives. We are close to finishing a study on the reasons for the sharp periodic fluctuations in the polar fox, squirrel and white hare population (N. N. Sokolov, O. V. Yegorov, M. V. Popov and others). The results of this work will be of importance in the commercial trapping of the Republic. The Laboratory of Plant Biochemistry under the direction of A. D. Yegorov is busy analyzing the materials which have been gathered over the preceding years on the biochemical value of feeds and is preparing a monograph on this question. The soil experts of the Affiliate headed by V. G. Zaol'nikov and with the participation of a group of botanists (B. V. Kuvayev and others) have finished a cycle of research carried out over the period from 1950 to 1955 on the complex study of soils, vegetation, the conditions of agriculture and the means for developing it in the central and south-western regions of the Yakutsk ASSR. The sector of botany has carried out a large work on the typology and industrial evaluation of the forests in the basins of the upper branches of the Lena and Aldan Rivers. Since 1956 the basic forces of the soil mechanics and botany sectors have been transferred to a study of the Vilyuy group of regions in connection with the diamond problem.

There is exceptional scientific interest in the research on the particular features of light absorption by plants in the Transpolar /Zapolyar'ye/ region and other northern regions; this research has been carried out by the Laboratory of Plant Physiology under the direction of V. P. Dadykin. This research shows that through a more intensive use of light (chiefly in the thermal part of the spectrum) the plants some how compensate for the insufficiencies of heat in their environment.

The Institute of Language Literature and History which was organized as early as 1935 has been taken into the Affiliate. Its small but highly qualified collective (Z. V. Gogolev, director) numbers 23 co-workers including 2 doctors of science and 6 candidates of science.

Since its founding the Institute has accomplished a collecting and analysis of numerous materials on archeology, history, language, folklore and the material culture of the Yakutsk and several other peoples of the North. On the basis of these materials they have published more than 90 works which cover about 900 printed pages. They have published the first volume of Istoriya Yakutskoy ASSR /The History of the Yakutsk ASSR/ (A. P. Okladnikov) which deals with the ancient period of Yakutiya's history. In 1957 they will publish the second volume which includes the period from the entry of Yakutiya into the

Russian government to 1917. A group of authors has published Ocherki istorii Yakutii sovetskogo perioda /Outlines of the History of Yakutiya during the Soviet Period/. All of these works give for the first time a continuous and complete picture of the historical development of human society on the enormous territory of Yakutiya from the earliest times to our own days. The works of the Institute such as Lenskiye drevnosti /The Lena Antiquities/ (A. P. Okladnikov), Yakutiya v XVII veke /Yakutiya in the 17th Century/ and also a number of articles in collections and journals give a picture of the movement in the paleolithic and neolithic cultures of man in the Far North and they wipe out a white patch on the archeological map.

Specialists have given high praise to the works of the linguists such as Sovremennyy yakutskiy yazyk /The Modern Yakutsk Language/, Tipy glagol'noy osnovy v yakutskom yazyke /Types of Verbal Forms in the Yakutsk Language/ (L. N. Kharitonov), Issledovaniya po sintaksisy yakutskogo yazyka /Research on the Syntax of the Yakutsk Language/ (Ye. I. Ubryatova), Zvukovoy sostav yakutskogo yazyka /The Sound Composition of the Yakutsk Language/ (P. P. Barashkova) and others.

Regardless of the significant scope and the comparatively broad range of the research, the Affiliate is still lagging in the solution to basic questions in the development of the productive forces of the Yakutsk ASSR.

The mobilization of the internal forces and the transition in the direction of work is being carried out by us, but this is still far from sufficient. We need extensive and general assistance from outside. In the Affiliate we must create institutes for mining and diamonds, and subdivisions for the study of the problems of energetics and transportation. We must also expand the already organized Institute of Geology. The realization of this important and immediate task demands the recruitment of a significant number of highly skilled specialists, the construction of the laboratory facilities, the equipping of them with up-to-date technology and a great increase in the money assigned for expeditionary work.

The collective of scientific workers at the Affiliate is sure that the Siberian Department of the AN USSR will give us this sort of active assistance.

ON CERTAIN RESULTS OF THE ACTIVITY OF THE KAZAN AFFILIATE OF THE ACADEMY OF SCIENCE USSR

/Following is the translation of an article by K. V. Nikonorov in Izvestiya vostochnykh filialov Akademii nauk SSSR, No 8, 1957, pp. 86-99./

The Kazan Affiliate of the AN USSR was created in April 1945. In August of the same year the Presidium of the AN USSR established the structure of the Affiliate. The beginning of the scientific activity of the KFAN /Kazan Affiliate of the Academy of Science USSR/ dates approximately from December 1945. Within the KFAN there were organized the following bodies: Chemical, Physical-Technical, Geological and Biological Institutes, an Institute of Language Literature and History, a Department for Water Control Problems, and since 1949, a Station for the Electrification of Agriculture and Forestry located in Yoshkar Ola. Up to the present time the Affiliate's structure has remained basically without changes, with the exception that the Department for Water Control Problems was renamed the Department of Energetics and Water Control. The Mariyskaya Station in 1956 was transferred to the Ministry of Higher Education and in May 1955, we created a Laboratory for Physico-Chemical Research. The personnel of the Affiliate over these years has grown by almost 2 times.

At present in the Affiliate we have 148 scientific workers (of them there are 2 academicians, 12 doctors and 94 candidates of science), and 92 laboratory assistants (of them 80 have a higher education). All of the institutes have significantly been staffed with new and skilled personnel. Over this period 64 persons have defended their candidates' dissertation (50% of them were Tatars). Thus, in the Chemical Institute in 1946 there were 5 candidates of science, and now there are 17; in the Institute of Language, Literature and History in 1946 there were 3 candidates of science and now there are 22. The matter of training the personnel with higher skills has been significantly poorer. During the existence of the Affiliate only 3 candidates of science have defended their doctoral dissertation.

For their outstanding scientific achievements, 4 workers in the Affiliate (the Academicians A. Ye. Arbuzov and B. A. Arbuzov, and the Corresponding Members of the AN USSR, N. G. Chebotarev and G. Kh. Kamay) are recipients of the Stalin Prize, while a number of the co-workers in the laboratories of organic, inorganic and physical chemistry, physics, and the sector of language have at one time or another been awarded the

prize of the Presidium of the AN USSR.

The Kazan Affiliate of the AN USSR over these 11 years has become a major scientific institution and has carried out a number of works which are of definite scientific and practical interest.

From the moment of its founding the Affiliate has found that the Chemical Institute was one of its leading organs.* [See Note] The Institute is headed by an outstanding chemist in our country, the Academician A. Ye. Arbuzov who is at the same time the irreplacable chairman of the Affiliate's Presidium.

(* [Note] On 2 August 1947, in connection with the 70th birthday of A. Ye. Arbuzov, the Chemical Institute of the Affiliate was named in his honor.)

The scientific activity of the Chemical Institute Imeni the Academician A. Ye. Arbuzov is carried on in four laboratories: organic, inorganic and physical chemistry and petroleum chemistry.

The basic direction in the work of the laboratory of organic chemistry (Academician V. A. Arbuzov, director) is research in the field of the organic compounds of phosphorous and other elements in the 5th group of the periodic table of D. I. Mendeleyev. This direction is the logical continuation of the research of A. Ye. Arbuzov which he has been conducting since 1901. With full justification he can be considered a founder of modern chemistry dealing with organic phosphorous compounds.

The collective of co-workers in the laboratory is giving great attention, for example, to the study and application of the reaction of converting esters from the acids of three-valent phosphorous under the action of haloid alkyles in the esters of the acids from five-valent phosphorous. This reaction is extremely important in the chemistry of organic compounds of phosphorous; it was discovered by A. Ye. Arbuzov and has received wide renown under the name of the "Arbuzov rearrangement." It has within it great synthetic possibilities and serves as a subject of research for many chemists both here and also abroad. At present about 400 syntheses have been described which occur in accordance with this reaction. Only in the Kazan Affiliate have they used the Arbuzov rearrangement for complete esters of phosphorous and phosphinous acids which has made it possible to synthesize a great number of esters of phosphinic acid of various types (N. I. Rizpolozhenskiy, D. Kh. Yarmukhametova). In using carbon tetrachloride for this reaction, G. Kh. Kamay, N. A. Chadayeva, and Z. L. Khisamova were able to get trichlormethylphosphinic acid. N. P. Grechkin received interesting compounds from this method. He synthesized methyl- and dimethylbenzanthrones with a phosphonium group in the methyl radical.

The use of the Arbuzov rearrangement with the employment of haloid derivatives of several simple organic compounds as haloid alkyles brought about the synthesis of earlier unknown types of organic derivatives of phosphorous which contained a direct bond of phosphorous-silicon (A. N. Pudovik), and phosphorous-arsenic (H. Kh. Kamay). The characteristic feature of these new types of organic phosphorous derivatives is the ease in breaking the bond of the phosphorous with

the silicon and arsenic under the action of acid and alkali agents. G. Kh. Kamay synthesized a significant number of esters of arylalkylphosphinic acids.

The given examples do not exhaust the works in the Affiliate on the application of the Arbuzov rearrangement. We shall give additional information on this below.

Twenty-five years ago, A. Ye. Arbuzov and B. A. Arbuzov discovered an interesting uniqueness in the flow of the reaction between sodium diethylphosphite and the haloid derivatives of triphenylchlormethane. Under the interaction of the sodium diethylphospite and the triphenylchlormethane, the reaction occurred normally and led to the formation of the ethyl ether of triphenylmethylphosphinic acid. If instead of triphenylchlormethane one took triphenylbromethane, this leads to the formation of a free radical of triphenylmethyl and an unknown composition of a phosphoro-organic compound. The fate of the phosphonium part of the products of the reaction for a long time remained unclear. This problem was solved in 1951-1952 by A. Ye. Arbuzov and F. G. Valitova.

A significant success in the synthesis of phosphoro-organic compounds was the discovery by A. N. Pudovik of new methods for synthesizing the esters of phosphinic acids with various functional groups with the hydrocarbon radical in the phosphorous by the means of joining the dialkylphosphorous acids to the limitless compounds with double and triple bonds and the activating double and triple bond groups. This method made it possible to obtain easily the most varied phosphinic acids and their derivatives. The second new method for synthesizing the esters of phosphinic acids which was discovered during this period was the method of joining the dialkylphosphorous acids to the carbonyl group of aldehydes and ketones. This method was worked out by A. Ye. Arbuzov and M. I. Azanovskaya (Kazan Chemical Technical Institute) and later by V. S. Abramov (KTCI) and A. N. Pudovik (KFAN, Kazan State University).

Great attention has gone into the synthesis and study of the properties of the esters of alkylphosphinic acids. Until recently the alkylphosphinic acids and their esters had been studied very little due to the difficulty in their synthesis. Several years ago convenient methods were found for obtaining alkyldichlorphosphines and dialkylchlorphosphines. By using these basic compounds, N. I. Rizpolozhenskiy (KFAN) and A. I. Razumov (KCTI) synthesized a great number of esters of ethylphosphinic acid. By adding sulfur and selenium to these esters, they obtained the esters of ethylthiophosphinic acid and ethylselenophosphinic acid. The Arbuzov rearrangement of the esters of ethylphosphinous acid leads to the obtaining of esters of dialkylphosphinic acids, and the analogues of dialkylphosphorous acids. They have also done work on the synthesis and study of the conversion of the esters of dialkylphosphinous acid.

From 1947, the Chemical Institute has been doing intensive research on the esters of pyrophosphinous, subphosphoric, pyrophosphoric acids and their thioanalogues.

In the process of this research they received representatives of new types of compounds which contain 1, 2 and 3 atoms of phorphorous in the molecule. Thus, P. I. Alimov in utilizing the anhydride character of the esters of subphosphoric, and to a even greater degree pyrophosphinous acid synthesized a number of new types of organic phosphorous derivatives.

Interesting products were received by P. I. Alimov under the interaction of the esters of pyrophosphinous acid with the aldehydes. The reaction to some degree is reminiscent of the interaction of the anhydrides of organic acids with the aldehydes. However in the case of the pyrophosphinous ester a compound is produced of a one phosphonium radical with a P-S bond and one by the P-O bond. The products received are in themselves mixed esters of phosphorous and alpha-oxiphosphinic acids. They contain three-valent phosphorous and are free to undergo the Arbuzov rearrangement.

A. N. Pudovik with his co-workers and independently from the work of the German chemist Perkov have studied the reaction of phosphites with alpha-haloidaldehydes in conducting the reaction of triethylphosphite with bromacetone. They found that the reaction moves in two directions-- according to the scheme of the Arbuzov rearrangement with the formation of ketophosphinic ester and anomalously with the formation of diethylisopropenyl ester of phosphoric acid. It was shown that the respective speed of the flow of these two reactions depends upon the nature of the haloid in the habidketon, and its condition and temperature during the experiment. They have also studied the reaction of phosphites with mono- di- and trihaloid derivatives of acetone, methylethylketon, acetophenone, cyclohexanone and a few others. In the majority of cases the reactions occurred anomalously. Other anomalous reactions were those of the reaction of phosphites with chlor- and dichloracetoacetate and with chlorphosphoniumacetone, acetylacetone, with chloranhydrides of alpha-haloid replacing carboxylic acids.

They have also studied the reaction of joining dialkylphosphorous acid to trichloroethanal (K. V. Nikonorov). They received esters of oxitrichloralkylphosphinic acids. By the action on these esters by the chloranhydrides of dialkylphosphorous acids and by the chloranhydrides of carboxylic acids they received respectively dialkyl esters (dialkylphosphonium) of trichlorethylphosphoric acid and trichlorethylcarboxylic acids.

N. P. Grechkin synthesized interesting derivatives of phosphoric acid which contain an ethylenimine ring. On the basis of the ethylenimine derivative they received other interesting compounds of this type.

Much work in being done in the Institute on the synthesis of acid esters of three-valent arsenic (G. Kh. Kamay and co-workers). As a result of the experiments for the first time they have synthesized various alkyl esters of arsenous, arylarsenous, diarylarsenous, arylalkylarsenous acids.

One must also point to the successes of the Laboratory of Organic Chemistry in the synethsis and study of some phosphoro-organic

insecticides which are new and very effective means for combatting insect pests on agricultural crops. We have tested the means which have been described in journals and patent literature for making tetraethylpyrophosphate and tetraethylmonothiopyrophosphate and have proposed several of our own original ways for synthesizing them. However the extensive use of the first of these preparations in agricultural practice is complicated by its high toxicity for warm blooded animals and its low resistence to hydrolysis. For the same reasons tetraethylmonothiopyrophosphate has not as yet found wide use as an insecticide.

While studying the physiological properties of the latter preparation we discovered its strong myotic action on the eyes and its ability to lower intraocular pressure. These properties were of interest to the workers in the medical institutions where they have used tetraethylmonothiopyrophosphate for treating glaucoma. A four-year testing of this substance in the ocular clinics of Moscow, Kiev and other cities have shown the finest results. In its action tetraethylmonothiopyrophosphate, called for short Phosarbine, surpasses at present all of the limited preparations which are used in treating glaucoma. Phosarbine has been accepted by the Ministry of Public Health for introduction into medical practice.

Of great interest for the fight against pests on citrus trees, for eliminating pasture worms, and for protecting corn starts from insect pests, etc. is the preparation tetraethyldithiopyrophosphate (abbreviated Dithiophos). This compound is less toxic for warm blooded animals than the one mentioned above and has more resistance to hydrolyzing agents. At the Affiliate we have worked out a simple method for manufacturing it. This year the preparation has been manufactured by the Ministry of the Chemical Industry in the form of a test lot and will be tried on the fields of the land.

One can see bright hopes for octomethyltetraamidepyrophosphate (Octamethyl) for protecting agricultural crops and particularly for cotton starts. This compound is one of the most interesting insecticides of system action, for it is able to penetrate into the plant both through spraying and by irrigating the soil with an aqueous solution of the preparation, and it will make the plant for a protracted period of time poisonous to the pests.

A particular feature of Octomethyl which distinguishes it from many of the other poisons of system action is that the preparation has little contact toxicity, and this permits it to be used with chemical and biological methods for combatting insect pests.

Research on Octamethyl has been going on over several years at the Affiliate in cooperation with the industrial enterprises and the Scientific Institute on Fertilizing and Insect Fungacides Imeni Ya. V. Samoylov. The preparation has passed all stages of experimental testing. In 1956 the Ministry of Agriculture USSR accepted it for introduction into practice. In 1957 the Ministry of the Chemical Industry manufactured 25 tons of the preparation and in 1958 they plan to make 500 tons more of it.

The Laboratory of Organic Chemistry year in and year out offers ever new compounds for testing as insecticides and drugs. This year they will test a number of preparations of various clases of phosphoro-organic compounds.

It must also be pointed out that in recent times much attention has been given to a study of the properties of these new classes of phosphoro-organic compounds from the point of view of clarifying the relationship between their structure and physiological activity. To this end they have synthesized and studied various esters, amidoesters, haloidoesters of pyrophosphoric and thiopyrophosphoric acids (K. V. Nikonorov, G. M. Vinokurova, I. D. Neklesova, Z. G. Speranskaya). Work is continuing in this direction.

The Director of the Laboratory, the Academician B. A. Arbuzov over the past 5 years has gone abroad and given reports at the Meeting of the French Physico-Chemical Society in Paris (1953), at the World Congress on Theoretical and Applied Chemistry in Zurich (1955) and at the Symposium on the Chemistry of Organic Phosphrous Compounds at Cambridge (1957).

Within the Laboratory of Organic Chemistry there is a group for petroleum chemistry (now it is being turned into an independent laboratory). Until recently it has been headed by Ye. A. Robinzon. Beginning in 1946 the group has been occupied with a study of the chemical composition of oil and gases from the deposits of the Tatar ASSR. For ten years of work the group has obtained extensive and interesting experimental material which in the beginning of 1957 was made public in the form of a monograph entitled Nefti Tatarskoy ASSR /Oils of the Tatar ASSR/ (Ye. A. Robinzon).

The group on petroleum chemistry is closely tied to the association /ob"yedineniye/ "Tatneft'" /Tataroil/ and it works in creative cooperation with its Central Scientific-Research Laboratory.

The activity of the Laboratory of Inorganic Chemistry of the Chemical Institute (G. S. Vozdvizhenskiy, director) is devoted to research on several electrode processes which are of practical significance. Here they are studying in detail the electrolitic polishing of metals, its particular features, the mechanism in the process of smoothing irregularities, the fine structure of a metallic surface, which precedes electrochemical working.

From practice it is well known that one and the same metal in some instances easily undergoes electrochemical polishing and in such a working it takes on fulguration and smoothness but in other instances it doesn't reach this. Obviously there are reasons which cause the process of electrochemical removal of irregularities and the process of anode difussion to go on unevenly in one and the same electrolyte and under similar or the same conditions.

In 1947 G. S. Vozdvizhenskiy in studying the influence of a preliminary mechanical and heat treatment of metal on its polishing capacity in the electrolytic bath, established that the process of metal transition in dissolution depends first of all on the crystallo-

graphic homogeneity or heterogeneity of its surface. If the surface of the metal is filled with crystallographic elements which are distributed regularly then this regularity tells also on the process of electrochemical diffusion; the chaotic distribution of the crystallographic elements more often leads to a corrosion of the surface.

By systematic testing it was established that there is a direct link between the crystallography of the metal surface and the electrochemical process. Various types and methods of mechanical working of metals such as rolling, broaching, or cutting by cutters or abrasives creates not only a different character in the relief of the metallic surface but also in the determined distribution of the crystals and the definite characteristics of the metal lattice.

In comparing the electrode potentials of various facets of the metallic monocrystals, and by studying the texture of the metal by X-ray methods, the scientists who are working in this laboratory (G. P. Dezider'yev, A. Sh. Valeyev, V. A. Dmitriyev, S. I. Berezina and others) connect this data with the behavior of metal in the process of electrochemical diffusion. At present this field of research is expanding singificantly; they have begun to study the structure of the metallic surface which has undergone electro treating with the aid of an electron microscope.

Along with this the Laboratory is conducting research on those changes in the composition of the electrolyte in the delicate pre-electrode layer which electrolysis causes. In the discharge of hydrogen ions on the cathode and hydroxyl on the anode deep chemical changes occur in the pre-electrode zones which tell above all on the acidity of the electrolyte and on the concentration of the hydrogen ions at the electrodes. The co-workers of the Laboratory have worked out a method for studying the concentration of the hydrogen ions in the most delicate pre-electrode layer where also the electrochemical process is completed. It has seemed that this concentration can be essentially distinguished from the concentration in the extent of the diffusion; in a number of instances it can be hundreds of thousands of times less. In the Laboratory they are also studying the acidifying processes on the electrodes, the electroplating of some metals on an electropolished surface, and the physicochemical properties of the electropolishing electrolytes.

The research on theoretical questions is not divorced from practice. In 1952, the methods proposed by the Laboratory for electropolishing cutting instruments, nickel platings and wares from stainless steel were introduced into a number of the Kazan plants, and later became the property of other enterprises.

In 1953 the senior scientific worker of the Laboratory G. P. Desider'yev in cooperation with the mechanic of the Yudinsk railroad shops, P. K. Shibayev worked out, built and tested a rail-cutting machine which has a great savings and technological effect; a rail can be cut in 3-5 minutes.. The machine works by anode-mechanical action. In 1955 the Kazan railroad turned to cutting rails by the anode-mechanical method.

A main field of the research conducted by the Laboratory of Physical Chemistry (L.G. Berg, director) is phase conversions. With the assistance of thermography and gas volumenometry here for the first time they have worked out a method of precision phase analysis which is based on the successive measuring of gas volumes which are separated from various compounds under defined conditions. This method in particular has been proposed for the phase analysis of sedimentary rocks, some ores, loamy deposits, natural salts and others.

Another area which is organically related to the foregoing is the use of thermography and gas volumenometry for detailed research on a number of processes in phase conversion such as the chemical interaction, disintegration and others. They have developed methods for determining steam pressure & dissociation pressure under isobaric conditions (Berg and Sidorova), rapid gasovolumenometric element analysis for organic substances (Berg and Gromokova), rapid determining of moisture content in products and semifinished goods (Berg, Anoshina and Gromakova), gasovolumonemetric definition of elements in the I and II analytic groups, etc.

At the same time they have perfected methods used in thermography and gas volumenometry; they have worked out automatic methods of volumenography, rectilinear heating, measuring the volume of escaping gases and other processes.

They have conducted a search for precision methods of thermography, and for determining heat conductivity, heat capacity and heat effects (Berg, Yafarov and Sidorova). They have worked out a new method for thermographing which can be universally used for complex determining of the thermal characteristics of the solid phase.

Thermography and gas volumenometry were also used for solving a number of practical questions. For example, is searching for a rational method for calcinating dolomite, they succeeded in disclosing a method for extracting from the dolomite (of which there are enormous reserves on the territory of the Tatar ASSR) a high quality binding material. At present it is only a matter of rapidly constructing a special oven for semi-calcinating dolomite. Various methods of gas volumenometry have been used for an analysis of rock in the laboratory of the 25th Expedition of the Hydroelectric Designing Institute at the site of the Kuybyshev Hydroelectric Station, & rapid determinations of moisture content in the raw materials and products at Factory No 8 "Kinoplenka" /Movie Film/ in Kazan'.

Interesting scientific research is going on in the Affiliate's Physico-Technical Institute (Kh. M. Mushtari, director) which has a laboratory for physics and 2 sectors, mathematics and mechanics. The main scientific interest of the physics laboratory is research in the field of paramagnetic resonance which was discovered in Kazan University in 1944 by Ye. K. Zavoyskiy (now Corresponding Member of the AN USSR and Laureate of the Lenin Prize in the field of science). One must point out that from January 1946 (i.e., from the moment of its organization) to the fall of 1947, Ye. K. Zavoyskiy was the head of

of the Affiliate physics laboratory. From the end of 1947 work has gone on under the direction of one of his closest students and co-workers, B. M. Kozyrev.

The discovery of Ye. K. Zavoyskiy has laid the basis for a rapid development in a new field of physics, the so-called magnetic radio-spectroscopy. The results of the given problem are being studied in scores of laboratories in many nations. The study of various types of paramagnetic resonance provides important information on the structure of substances. It enables one to define the magnetic and mechanical moments of the atom nuclei, atoms, ions and molecules; it explains many details in the structure of crystals and liquids, and is capable of explaining such purely chemical questions as the determining of hydrate structures, complex compounds and even details of the structure of molecules in organic compounds.

The Ye. K. Zavoyskiy effect has been observed at the Affiliate physics laboratory in liquid solutions of paramagnetics, in some grossly dismagnetic organic compounds, in silicate glasses, in a number of metals and in a large number of solid paramagnetic salts such as the salts from rare-earth elements.

It should be noted also that the organic chemists of the Affiliate have given the physics laboratory some assistance in the development of its work. The difficult to obtain free radical $\alpha\alpha$ - diphenyl - β - trinitrophenyl hydrazyl (which was synthetized by V. G. Valitova under the direction of A. Ye Arbuzov) has proved to be very valuable as a calibrating device for paramagnetics and at present it has replaced much more complicated methods.

As a result of the research conducted by the co-workers of the laboratory, they have explained many basic patterns in paramagnetic resonance. It has been established that the main factors which determine the form and width of the lines of paramagnetic resonant absorption are the magnetic-dipole, exchange and, electrical interaction (S. A. Al'tshuler, Ye. K. Zavoyskiy, B. M. Kozyrev). They have discovered an anomalous dispersion of magnetic susceptibility and weak absorption lines in accordance the transitions between the magnetic fields(podurovn') with $\Delta M 1$ (Ye. K. Zavoyskiy). They have observed paramagnetic resonance in free organic radicals (B. M. Kozyrev, S. G. Salikhov). They have also discovered the action of atom nuclear spin on the lines of paramagnetic resonance, i.e., the hyper-fine structure of the lines (A. S. Al'tshuler, B. M. Kolyrev, S. G. Salikhov).

An extensive study of the electron paramagnetic resonance in liquid solutions, in addition to the data on the hyperfine structure of the absorption lines has also provided important material on the electrical and magnetic interations in the solutions and also on the resistance of ion solvate coatings and on chemical complex formation (B. M. Kozyrev, N. S. Garif'yanov).

Measurements of paramagnetic resonance in supercooled solutions and in vitreous substances have provided much material on the ultra-fine structure of absorption lines (N. S. Garif'yanov). The most

important result worked out in this field was the recently achieved definition of the spin of the nucleus of Fe-57 (N. S. Garif'yanov, M. M. Zaripov, B. M. Kozyrev). We might note that the attempts of several foreign researchers to determine this spin have not been successful.

Research on proton resonance in liquid solutions of paramagnetic salts has enabled us to receive valuable data on the molecular properties of electrolyte solutions, and in addition to work out an effective method for a quantitative study of complex formation in solutions (A. I. Rivkind).

In the experimental study of the spin-spin relaxation by a method of parallel fields they substantiated the thermodynamic theory of Shaposhnikov. They also worked out an effective method for determining the constants of magnetic heat capacity which is important for the method of magnetic cooling. They observed a second relaxation in the spin system at room temperature. They secured much experimental material on the spin-lattice relaxation (they derived the theoretical calculations of the time for a spin from relaxation) for the ions of the iron group with an even number of electrons (B. N. Kozyrev, N. G. Garif'yanov, P. G. Tishkov, V. I. Avvakumov).

In the laboratory they also carried out work on the paramagnetic resonance in coals and alkali metals--Na, Li (N. G. Garif'ynaov, B. M. Kozyrev). They have not only theoretical but also practical interest for the national economy. In particular the measurement of the effect in the dispersed metals may be successfully used for determining the qualities of particles, and the effect in coals for a study of their absorptive properties.

The scientists of other countries evidence great interest in the work of the Kazan physicists. Thus in the summer of 1953, B. V. Kozyrev was invited to Paris where at the annual meeting of the French Physico-Chemical Society he gave a summary report on electron paramagnetic resonance. In 1955, B. V. Kozyrev was invited to a conference of the Faraday Society in Cambridge where he gave a report on the goals of the laboratory's work in the field of electron and proton resonance in solutions. Both reports were highly regarded by the scientists from various countries of the world.

In addition to the basic group of co-workers who are working in the field of magnetic radiospectroscopy, there is also a small group which is studying semiconductors. This group is studying the phenomena which occur at the area of contact of semiconductors with the metals, and also the contact between the semiconductors.

Much work is going on in the sector of mathematics (from 1946-1947, it was headed by the Corresponding Member of the AN USSR, N. G. Chebotarev and then G. S. Salekhov).

In 1947 N. G. Chebotarev published a large monograph entitled Problema Raussa-Gurvicha [The Rauss-Gurwitsch Problem]. This problem is related to the solution of questions in the theory of automatic control in technology.

Over the years 1948-1950, A. P. Norden conducted intensive research on the geometry of affine-connected biaxial spaces. His research on differential geometry of continuous congruence was published in 10 magazine articles.

In 1946-1951, G. S. Salekhov and this students took up a study of the new Cauchy-Kovalevskaya problem for equations in partial derivatives in the area of functions with an arbitrary degree of smoothness which are of importance in explaining the nature of solutions to equations in mathematical physics. At present more than 15 works have been published on this problem.

In 1950-1954, the sector worked out different methods for an approximate solution to non-linear functional equations and methods for computing series which can be applied in the solution of boundary problems in mathematical physics. The results of the research have gone into G. S. Salekhov's monograph Vychisleniye ryadov [Series Computation].

In connection with the rapid development in the petroleum industry in the Tatar Republic the sector of mathematics in the fall of 1951 chose as one of the basic directions of its scientific activity research on the theory of filtration of natural liquids in a porous medium and principally the questions related to water-oil contact displacement. These questions are of particular importance for working the oil deposits of Tatariya by using progressive methods of inter and intracontour flooding.

The sector has established for the first time and did research on the problem of controlling displacement petroleum bearing contours as a converse boundary problem in mathematical physics. For the solution of this they studied various factors (viscosity of liquids, phase permeability, etc.) and they worked out the mathematical methods which due to their general qualities can be used not only in subterranean hydromechanics, but also in other fields of mathematical physics. They have created numerical methods for computing the displacement of the oil bearing contour in a single-liquid system. The task of researching the contour with the aid of various viscosities leads to the Cauchy problem for a new class of integral-differential equations in partial derivatives. They have proposed numerical and graphoanalytic methods of solutions for the case of arbitrary forms of contour and arbitrary bore distribution and operation conditions.

Some of the results of the sector's work have been applied in the plans for working the oil deposits.

The mechanics sector from the beginning of the Affiliate's organization has been working under the direction of Kh. M. Mushtari on the problem of "Non-linear theory of elastic Casings". They have devoted most of their attention to research on the limiting flexure and resiliency of delicate plates and casings. They have succeeded in obtaining a number of new results in the development of non-linear theory. Related to this are the following: the elaboration of the theory of casings with initial stresses (Kh. M. Mushtari, K. S. Galimov),

the establishement of the classification and qualitative analysis of the problems of non-linear theory of casings, the development of the non-linear theory of the boundary effect, the construction of the theory of casings with initial irregularities in forms the formulation of inverse boundary problems in the non-linear theory of inclined casings. They proposed a theory of small but limiting casing flexure which stands in an intermediate position between the linear theory and the general non-linear theory of casings (Kh. M. Mushtari).

The sector has devoted much of its work to developing methods for solving the boundary problems in the non-linear theory of casings. At present they have completed research on the elaboration of a method on the variation of the state of stress which is applicable to the general non-linear theory of casings and they have developed a combined method which has been proposed by the Corresponding Member of the Estonian AN, N. A. Alumyae (K. A. Galimov). By altering the method of Galerkin, they have proposed various variations of the method of sequential contractions and perturbations. They have worked out the means of estimating the precision of the determination of the fluctuation frequency and critical loading of elastic systems by the Bubnov-Galerkin method (I. V. Svirskiy). For the first time A. V. Sachenkov has used the method of integral equations in the theory of casing stability. Also a method has been worked out for a precise solution to a number of a broad class of boundary problems in the non-linear theory of casings (K. Z. Galimov).

In addition to this the workers of the sector have provided the solution to a number of problems in the theory of elasticity and flexure of cylindrical, conical and spherical casings under various loads; in each instance particular attention was given to a comparison of the effectiveness of one or another method of solution. These tasks were brought forward primarily by the national economy. They have been solved successfully.

The results of the sector's research have been published in the monograph of Kh. M. Mushtari and K. A. Galimov under the title Nelineynaya teoriya uprugikh obolochek [The Non-Linear Theory of Elastic Casings].

Within the sector of mechanics through their own efforts they have created a small laboratory for which they have designed and made the equipment and instruments which permit them to determine for example the sums and differences of the main pressure by the optical method by means of a single model from an optically active material (with boundary effects disregarded) (B. M. Zuyev). This technique in 1951-1952 was applied to research on the stresses of a single model of the sections of the dam at the Kuybyshev Hydroelectric Station; the critical remarks resulting from the investigation were studied for the compilation of the final variation of the dam's design.

The work of the Geological Institute of the Affiliate (L. M. Miropol'skiy, director) is closely linked to the needs of the rapidly developing oil industry in the Tatar ASSR. Main attention is being given to a general study of the geological structure of the oil deposits of the Republic. The Institute geologists jointly with the workers from the "Tatneftegazrazvedka" Trust /Tatar Gas and Oil Drilling Trust/ have worked out a scheme for the stratigraphic separation in the Devonian deposits of the Tatar ASSR (L. F. Solontsov, G. P. Batanova, V. N. Troyepol'skiy, S. S. Ellern and others). This scheme is used by the geological organizations which are working on the territory of Second Baku /Vtoroy Baku/.

Research is going on on the forms of occurrence of the oil bearing layers (B. M. Yusupov), the composition and physical properties of the strata forming them, the variability of the oil-bearing strata in a wide area (G. L. Miropol'skaya, Ye. T. Gerasimova, A. I. Krinari, V. N. Loginova), the properties and conditions of occurrence in the subterranean waters which are the constant and inevitable accessory minerals to oil (M. S. Kaveyev, B. V. Vasil'yev). The study of these questions will be of great significance for the organization of prospecting and correct exploitation of the oil deposits.

A major achievement in the work of the Geological Institute is the establishment of commercial quantities of coal with low-grade carbon in the Tatar ASSR (A. P. Bludorov and others). The "Tatneftegazrazvedka" Trust has put down exploratory drills to a depth of 1000-1100 meters and the veins of coal there in places reach a capacity of up to 14 meters. They can be used for the purpose of subterranean gas production as well as for production with the aid of shafts.

The geophysicists of the Institute have proposed an original method for determining the depth of occurrence for crystalic bases according to geophysical data with an accuracy up to 1.5-2% (A. G. Salikhov). It should find wide application since the structure of the base determines to a significant degree the structure of the Bavlinian and Devonian deposits which are found on top of it.

The Affiliate has worked out a method for determining the poricity of strata according to an increase in the spontaneous polarization (A. I. Krinari); this eliminates the necessity of taking a sample while drilling, and permits one to establish the poricity and permeability of the rock on the basis of the data from the electrocarrotage of the drilling bore.

In connection with the wide application in oil drilling of the trans- and intracontour "zavodneniye" [illegible] of the oil strata a number of questions were solved regarding the use of the waters under the beds of minor rivers and as well the subterranean waters from the Permian deposit (M. S. Kaveyev, U. Z. Galeyev).

Great attention is being given to a study of the genesis of the sedimentary thicknesses and the individual types of sedimentary minerals and to an explanation for the regular patterns in their distribution and the regular connections between the origin and properties of the

strata. Such a direction in the work as well as in petroleum subjects has great practical results. Among them one should mention the discovery by the Institute's geologists in cooperation with the workers from the "Tatneftegazrazvedka" Trust of a number of fine dispersed tertiary clays in the east of the Republic (N. V. Kirsanov, K. M. Maksotova and others). These clays are needed for drilling work. One of the deposits called "Yamashinskoye" has been worked by the association "Tatneft'" for a number of years. On the basis of the other "Biklyan'skoye" deposit they have recently built in the city of Al'met'yev a plant which is now producing argillaceous powders. As a result of the research which has been conducted the drilling work is supplied by local clay raw material and there is enough to last for several decades.

In the recent years in the oil regions of the Tatar ASSR there has been extensive industrial and housing construction. The scientists from the Affiliate in line with this are solving the questions involved in supplying the new buildings with local construction materials. Thus the geologists in the Affiliate have established the possibility of organizing the production of cement in the east of the Tatar ASSR (Yu. V. Sementovskiy, V. M. Nezimov), and they have disclosed the most rational means for supplying the oil regions with other construction materials such as gravel, crushed stone, sand and building stone (N. V. Kirsanov, Yu. V. Sementovskiy and others).

Some important work of the Institute (sector of engineering geology) is on the elucidation of the conditions of engineering and geological durability of the construction of the city of Al'met'yev which is one of the main centers for the petroleum industry in the Republic.

The geologists from the Affiliate have and are now giving scientific assistance to the construction of the major electric stations on the Volga and Kama Rivers in developing construction materials and in studying the questions of engineering geology.

Of course one must also mention the geochemical research of the Institute. L. M. Miropol'skiy, in continuing the glorious tradition of the Russian geochemical school of the Academicians V. I. Vernadskiy and M. Ye. Fersman, is successfully developing topogeochemical directions in science. He wrote and published (1956) a monograph entitled Topogeokhimicheskoye issledovaniye permskikh otlozheniy v Tatarii /Topogeochemical Research on the Permian Deposits in the Tatar ASSR/. This work is of important significance for explaining the conditions of concentration and migration in the elements of the Permian formations of the east Russian plateau. This work significantly facilitates the prospecting here for various minerals.

Among the number of questions which are presently being worked on by the Biological Institute the most interesting one is the problem of the connection of the water system in plants with their mineral nourishment. This work is being carried out under the leadership of the Institute's Director, A. M. Alekseyev. The very posing of the question is new and completely original since up to now the water system

and the mineral nourishment in plants has been seen as two independent and not inter-related processes. The water system of a plant has generally be viewed as an osmotic phenomenon. Research by the Kazan physiologists has proven the dependency of the system on the colloidal and biochemical processes which occur in the cells. It was shown that the water system of the plants is strongly effected not only by mineral substances but also by products of their assimilation such as phosphoro-organic compounds (nucleoproteides and phosphatides) and the organic compounds of nitrogen (albuminous substances). Thus the research of A. M. Alekseyev and his co-workers is opening a new view of the physiological role of the elements of mineral nourishment.

The study in the Biological Institute of the water system and mineral nourishment of summer wheat has permitted us to work out a system of nitrogenphosphate feeding of this wheat on the grey forest soils which increase the harvest by 20% or more. The feeding has successfully passed production testing and has been accepted by the Ministry of Agriculture of the Tatar ASSR for introduction into practice.

One must also mention the botanical research which was conducted by V. I. Baranov in 1947-1949. He studied the peat bodies of the Tatar ASSR and also solved the question of the inability of the peat to float in connection with raising the water level of the Kuybyshev dam. As a result of the research they avoided the necessity of spending time and labor consuming work on preventing the flotation of the peat.

In recent years there has been a new direction in the work of the Institute and this is the study of the ecology of cultivated crops (corn and Sudan grass) as a means for increasing the productivity (A. P. Petrov, director). Research on corn starts under various ecological conditions has shown that the growth, development and harvest is closely dependent on these conditions under comparatively the same agricultural methods. Field research with Sudan grass has permitted one to establish the possibility of obtaining large harvests under the conditions of a cold and damp summer. Such research has important significance for working out the differential procedures for cultivating crops in accordance with the peculiarities of the natural conditions.

The zoologists of the Institute are studying in a planned way the fauna of the terrestial vertebrates (V. A. Popov) and the soil fauna (M. M. Aleynikova). Particular attention has been given to a study of the harmful rodents, and the changes in the population and the elaboration of measures for combatting them. Since 1957 they have begun to work on a new topic Ptitsy Volzhsko-Kamskogo kraya i ikh khozyaystvennoye znacheniye /Birds of the Volga-Kama Kray and Their Economic Significance/; this work is not a small part of the problem of Fauna SSSR /Fauna of the USSR/ which the Zoological Institute of the AN USSR is working on.

In the course of the research it was proposed to the Ministry of Agriculture of the Tatar ASSR that certain measures be taken in the fight against harmful rodents and insects. They have prepared a monograph Mlekopitayushchiye TASSR i prilegayushchikh respublik i oblastey /Mammals of the Tatar ASSR and the Neighboring Republics and Oblasts/.

From 1946 to 1951 the Biological Institute successfully carried on research on the physiology of animals in the area of neurohumoral regulation in the organism. The director of the work, the Corresponding Member of the Academy of Medical Sciences USSR, A. V. Kibyakov, in 1950 was awarded the Prize Imeni the Academician I. P. Pavlov.

The Institute of Language Literature and History is concerned with a study of the various problems of the Tatar language, literature and the history of the Tatar ASSR.

A monograph has been prepared and published on the morphology of the Tatar language. Its author, V. N. Khangil'din in 1954 was awarded the Prize of the Presidium of the AN USSR. A major monograph by V. N. Khangil'din Grammatika tatarskogo yazyka /Grammar of the Tatar Language/ has been published, as well as other work on phonetics, punctuation, and the historical grammar of the Tatar tongue.

Much work has been done on the study of the dialectology of the Tatar language (L. Z. Zalyalotdinov, director). They have thoroughly studied the common dialect of the Tatar language, and have compiled a dialectological map showing its distribution. The materials from the research are found in the work by L. Z. Zalyalotdinov Sredniy dialekt tatarskogo yazyka /The Common Dialect of the Tatar Language/. They have published dialectological and phraseological dictionaries and also a number of works which are devoted to the history of the Tatar language.

They have prepared and published (R. S. Gazizov, director) a Tatar-Russian dictionary, Russian-Tatar terminological dictionaries on physics and geophysics, mathematics, education and psychology, geography, and linguistics. A Russian-Tatar dictionary on chemistry is now being printed. They have compiled three volumes of a Russian-Tatar dictionary of which two are in print and the third is being printed. Work is now being completed on the fourth and last volume.

In 1954 they published Ocherki po istorii tatarskoy literatury nachala XX veka /Outlines on the History of Tatar Literature at the Beginning of the 20th Century/. At present they are compleing work on Ocherki po istorii tatarskoy sovetskoy literatury /Outlines on the History of Tatar Soviet Literature/.

A group devoted to the study of Tatar and Russian folklore has published two books Tatarskiye narodnyye skazki /Tatar Folk Tales/ and the anthology Tatarskoye narodnoye tvorchestvo /Tatar Folk Writing/ (Kh. Yarmukhametov, editor). A collection of materials on the Russian folk poetry in the Tatar ASSR is now being printed.

A significant part of the work in the Institute is devoted to the classics of Tatar literature. They have published a collection of works devoted to the 60th anniversary of the folk poet G. Tukay, and

they have prepared and published a four-volume Academy edition of his works. They are also publishing the verse works of M. Gafuri and Kh. Taktysh. They have prepared for publishing a two-volume edition of the dramatist G. Kamal. They are also studying the life and activity of the Tatar educator K. Nasyrov.

The Institute is giving significant assistance to the Ministry of Education of the Tatar ASSR. The writers and linguists are participating in the compilation of texts for middle schools and the Tatar departments of the VUZes /Institutions of Higher Learning/.

The co-workers in the sector of History (Kh. G. Gimadi, head) have finished the work on Istoriya Tatarskoy ASSR /History of the Tatar ASSR/ in two volumes; the first has been published and the second will come out in 1958.

In addition, having studied the question on the origin of the Kazan Tatars, the have collected and published materials on the history of Tatariya in the collections of documents Tatarskaya ASSR v gody Velikoy Otechestvennoy voyny /The Tatar ASSR During the Great Patriotic War/, and V boyakh za Sovietskuyu Rodiny /In the Fight for the Soviet Motherland/. A number of monographs have been published such as the ones on the history of the 1905 revolution (Khusain Yamashev by Kh. Kh. Khasanov), on the history of the foreign military intervention and the civil war in Tatariya (M. K. Mukharyamov) and the historical outline Kazan' by N. F. Kalinin, etc.

The group in archeology and ethnography (N. F. Kalinin) carry out annually excavations in the monuments of the land. They are creating an archeological map of Tatariya. Systematic research on the material culture of the peoples of the lower Volga region have permitted the publication of the monograph (N. I. Vorob'yev) Kazanskiye tatary /Kazan Tatars/ and Chuvashi /The Chuvash People/ (the latter work was carried out in conjunction with the scientists of the Chuvash ASSR).

The department of energetics and water control (Yu. V. Skobel'tsyn, head) until 1954 was concerned with a study of the course of small rivers in connection with the construction of the hydroelectric stations on the Volga and Kama Rivers, and in particular with the Kuybyshev Station. They established some regular patterns in the conditions of the formation of the local course, and also the dependence of the fall and spring courses on the geological, physico-geographical and other factors.

As for the research in the field of energetics, it was begun comparatively recently (about 3 years ago) with the participation in the working out of the materials for Tatariya and the land along the Volga dealing with the general problem of the AN USSR: "The development of a unified energetic system for the USSR and the energetics for the fields of the national economy." Since then they have obtained some interesting results. In particular they have proposed a new method for determining the calculated electrical loads for agricultural regions which permits a reduction in the costs and time for carrying out drafting work.

In 1956, the Affiliate organized the laboratory for physico-chemical methods of research. Its tasks are composed of a study of various questions by new physic-chemical methods. This laboratory has up-to-date equipment (an electron microscope, an electronograph, spectrographs in the infra-red and ultraviolet fields of the spectrum, etc).

The results of the scientific research from the laboratories and institutes of the Affiliate have been published in the form of 734 magazine articles and 71 monographs.

The Affiliate regularly holds scientific sessions and conferences on various questions which are being worked on in the laboratories and institutes.

Naturally in addition to the positive aspects in the activity of the Affiliate there are also shortcomings. Thus up to now we have had an insufficient concentration of the scientific forces on the solution to basic questions and in a few instances obfuscation was present. The introduction of the results of research into production as a rule has gone on extremely slowly. The Affiliate and its institutes have not been active in the questions involved in the coordination of scientific research. While the coordination with the central institutions of the AN USSR goes one more or less regularly, it is organized poorly with the VUZes and scientific-research institutions in the city of Kazan' and Tatariya as a whole.

Great difficulties are encountered due to the absence of sufficient working space and some types of equipment. The supplying of essential devices and materials is not well enough organized.

These difficulties and deficiencies in the work can be overcome, and undoubtedly they will be removed.

The collective of co-workers at the Kazan Affiliate above all sees its main duty in working on the solution to the tasks established at the 20th Party Congress so that in accordance with our own strengths we will make a contribution to the national concern of building communism in our country.

THE KOLA AFFILIATE OF THE AN USSR AND THE DEVELOPMENT OF THE PRODUCTIVE FORCES IN THE MURMANSKAYA OBLAST'

/Following is the translation of an article by A. V. Sidorenko, in Izvestiya vostochnykh filialov Akademii nauk SSSR, No 8, 1957, pp. 100-111./

From the History of the Affiliate's Organization

Even in the first years of the Soviet state, in following the instructions of Lenin's rough draft of a plan for scientific and technical work in Murman under the direction of the Academician A. Ye. Fersman, geological expeditions from the Academy of Science had begun to work in the area. At the end of the '20s they had discovered extensive deposits of apatite in the Khibin mountains; this discovery provided the basis for the development of the apatite industry. The creation beyond the Arctic Circle and in a completely uninhabited area of a major mining enterprise with a completely new type of raw material and a new technology for mining it, constantly posed the most various sorts of questions and scientific problems. In order to give maximum assistance to the new industry in such matters as the study of ores and the processes for mining it and the natural conditions where the new combine was being built, and in order to give maximum guidance to the numerous groups of geologists, geographers and botanists, in the summer of 1930 in Khibiny, on the shore of Lake M.-Bud'yavr, the Khibin Mining Station of the AN USSR was opened. In 1934 it was transformed into the Kola scientific-research base, and at the end of 1949 the base was reorganized as the Kola Affiliate of the AN USSR. The discovery by the scientists of the apatite deposits was the beginning of the apatite industry, and the development of the latter led to the organization of a scientific-research institution of the Academy of Science.

A large role in the creation of the apatite industry above the Arctic Circle was played by the Leningrad Party organization led by S. M. Kirov (at that time the Kola Peninsula /Kol'skiy poluostrov/ was part of Leningrad oblast'). S. M. Kirov was the organizer for the harnessing of the kray's wealth, and he repeatedly visited the Kola Peninsula. The scientific center in the Arctic area was created upon his instructions and through his support, and therefore in 1935 the Kola base of the Academy of Science USSR was named after this fiery tribune of the revolution, S. M. Kirov.

A significant role in the creation and development of the Kola base belongs to the outstanding Soviet scientist, the Academician A. Ye. Fersman who headed the station-base constantly over 15 years (1930-1945). A. Ye. Fersman was not only the stations' organizer, the director of the base and the administrative director, but above all the soul behind the new-born problem of harnessing the mineral resources of the Peninsula. His egregious theoretical prognoses for mineral prospecting, and his new and daring geochemical ideas directed the path of the research on the mineral wealth in the Arctic area. Upon organizing the scientific center in the Kola Peninsula, A. Ye. Fersman wrote: "The task of our station is three-fold: to serve science and theoretical scientific thought, to provide concrete and exact information for the economy and industry, and lastly, is must be the school for the arriving field trips and give them shelter and lead them in the mountains. It must be a broad institution for the general geographic, geochemical and economic study of all the oblasts adjacent to the Khirbin mountains....The station must have as its motto the unity of science and practice...."

A. Ye. Fersman drew scores of scientists to work in the Kola Peninsula as well as production enterprises of the Union and hundreds of researchers--geologists, geochemists, technicians, geographers, ore dressers, biologists, etc.

Already during these years the basic directions were laid down for the scientific work of the Mining Station; they were: the study of the geology, mineralogy and geochemistry of Khirbiny, research on the chemical composition of a number of rare minerals, and chemical-analytic research on the apatite-nepheline ores of the Kola Peninsula. In 1931 with the opening of the Polar-Alpine Botanical Garden, stationary and expedition research was begun on the vegetation resources.

From the very beginning of its existence the station-base has worked in close cooperation with the new enterprises of the Kola Peninsula in benefiting from the assistance and support of practice and also in its turn carrying out much research for industry. The close bond between science and production which was laid down by A. Ye. Fersman even during these first years of the base's existence, have become the fine scientific tradtion of our institution.

The Basic Scientific Directionsin the Work of the Kola Affiliate

In the more than 25 years of its existence, the Affiliate has turned into a major scientific-research institution in the Arctic area. Working here are 5 doctors of science, 45 candidates of science, and more than 100 scientific co-workers. Together with the auxiliary staff, the collective numbers now more than 400 persons.

The scientific activity of the Kola Affiliate has always been determined by the uniqueness of the mineral and other natural resources of the Murmanskaya oblast' and by the economic peculiarities in the development of its national economy. In the Peninsula we have disclosed

more than 14 deposits of various ores with reserves of world significance, and numerous lists of deposits with reserves of national significance. On the basis of these minerals we have created a powerful local ore-extracting and metallurgical industry which plays a substantial role in the national production of mineral raw materials. Thus from the apatite concentrations from Kirovsk, 3/4 of all the phosphate fertilizers in the nation are produced. The Peninsula plays an essential role in the production of nickel, cobalt, copper, aluminum and other non-ferrous metals. The Kola Peninsula has rare elements, iron ore concentrates, mica, and many others.

The main directions of the Affiliate's activity are the following: research on the geological structure of the Kola Peninsula as the bases for an understanding of the distribution of the mineral deposits, the study of the composition and structure of the individual deposits, the working out of technological schemes for reprocessing the mineral raw materials, research on the possibility of enriching the ores and the conditions for extracting them, and an estimate of the means for using the minerals in the national economy.

In accordance with this the leading scientific institution of the Affiliate is the Geological Institute with departments of geology and petrography, mineralogy and geochemistry, and laboratories for chemical analysis, X-ray structure, optics, spectral and phase anslysis, and a mineralogical museum. We are in the process of organizing departments of mineralogy and geochemistry of rare elements, geomorphology and geology of the quaternary deposits, and a group on geophysics.

In recent years the Affiliate has created the following organs: a laboratory for the chemical technology in reprocessing mineral raw materials, a laboratory for enriching rare-metal ores, a department of economics for mineral raw materials, a group on mining, a department of hydrology and hydroenergetics, and a laboratory for construction materials. These laboratories and departments have been united into a complex mining-technological sector which in the future will grow into a mining-technological institute.

There are enormous reserves of fish in the seas which surround the Kola Peninsula. This fact determines the thematic plans in the work of the Murman Biological Station which was transferred in 1953 to the Kola Affiliate. By a resolution of the Presidium of the AN USSR the Station was transformed into the Murman Marine Biological Institute of the Affiliate.

The Affiliate also has a seismic station which is the sole such institution in the European North of the country.

The Polar-Alpine Botanical Garden (Which is the northern-most botanical garden in the world) is working on a study of the vegetation resources of the Murmanskaya oblast', the enriching of the plant life by the means of transplanting plants from other natural zones, etc. The research on the vegetation of the region is being carried out by workers in soil science.

The Affiliate has at its disposal the necessary modern scientific equipment. The laboratories are well equipped; they have spectographic and X-ray structural analysis, physical methods of mineral research and a chemical analysis laboratory.

The scientific library has grown significantly and now numbers more than 110,000 volumes. Its literature on the Kola Peninsula is rather complete.

However the Affiliate still has many difficulties and much is still lacking. We are extremely hampered by a lack of working and living space since ... the same area that the Affiliate had formerly must now suffice for a staff that has doubled. Our laboratories and departments are built with great difficulty. At present the Affiliate's own plant and living quarters are being built at the station "Apatity." These buildings will be completely equipped for scientific work with laboratories, space for major laboratory experiments and pilot plant testing, with museums, special library stacks, experimental workshops, etc.

In the future in developing the existing departments and laboratories and in creating new ones, we must clearly keep in mind that the Affiliate cannot work on all of the questions which confront science in our complex national economy. Therefore we have the task of attacting other scientific institutions from the Academy of Science and departmental institutes to the Peninsula for experimental-research work. The Kola Affiliate must carry out a leading organizational role in this direction, in coordinating and cooperating in the scientific research which is being carried out by the various institutions on the Kola Peninsula.

The Affiliate has in the past carried out the coordinating role in the Peninsula. In recent years alone it has held more than 20 sessions and major conferences, field meetings on general questions in the development of science in the Kola Peninsula and as well on individual scientific and economic problems. One must especially point to the conferences on the problem of developing the titanium industry and on the problem of studying rare elements; these conferences were the first in the USSR on these subjects. The conference on the questions of how to grow plants in the northern cities which was held jointly by the Kola Affiliate and the Ministry of Communal Agriculture RSFSR, in essence turned into an all-Russian conference.

Numerous representatives from the scientific institutions not only of our oblast', but from Moscow, Leningrad and other cities participated actively in the conferences and sessions.

The experience in the work of the Kola Affiliate shows that the conferences, sessions and meetings on major scientific problems and also the coordinating role of the Affiliates serves, along with the scientific research, as one of the most important forms of activity for the peripheral scientific institutions.

A characteristic feature of the scientific activity of the Academy Affiliates is that they, in being on the periphery, as a rule are

directly connected with the enterprises and they draw the material for their research from the economic practices of the region, and they can test the results of scientific research on the spot.

The experience over 25 years which has been accumulated by the Kola Affiliate affirms the correctness of this path: from scientific-practical questions to more science and from the latter once again to applied scientific problems.

The Most Important Results of the Scientific Work

Of all the research on the natural resources of the Kola Peninsula most attention has always been given to geological work. Here, in addition to the sections of the Academy of Science and the Ministry of Geology, there has also been work conducted by various geological parties from the Ministry of Non-Ferrous Metallurgy, Construction Materials Industry and others. This research has established the basic features of the geological structure of the Kola Peninsula, and a geological map has been drawn up on the scale 1:1000000. At the present time the Ministry of Geology and Mineral Protection is completing the geological mapping of the Kola Peninsula on a scale of 1:200000 and the compilation of a summary monograph which is devoted to the geology of the Murmanskaya oblast'; this will be part of the multi-volume edition Geologiya SSSR /Geology of the USSR/. This work is the outcome of extended research by numerous geological parties, scientific sections and individual scientists.

In the study of the geology of the Murmanskaya oblast' a significant contribution has been made by the workers of the Affiliate. In the prewar period the geologists of the Kola base under the direction of A. Ya. Fersman carried out extensive and complex studies on the natural wealth of the Kola Peninsula and expecially on the minerals.

In these years the scientists of the Kola base in conjunction with the sections of the AN USSR disclosed most important mineral deposits which determined for the future the basic direction of the mining industry on the Peninsula. In 1926 the deposit of apatite and nepheline in Khibiny was discovered (A. Ye. Fersman and a. N. Labuntsov); in 1930, the sulfide copper-nickel deposits of Monchi (A. Ye. Fersman); in 1934, in the Lozoverskiye tundras the pay deposit of loparite a mineral which contains niobium, tantalum, titanium and rare earths (O. A. Vorob'yeva); in 1935, the deposits of perovskite and titanomagnetite in Afrikand (B. M. Kupletskiy and V. A. Afanas'yev). The geologists of the Leningrad Geological Prospecting Section and the Leningrad University in 1932 discovered iron ore in the region of Lake Kovdor and in the Zaimandrovskiy rayon (N. Ye. Zontov, D. V. Shifrin, D. V. Murashev), in 1934; the Keyvskiy deposits of high quality aluminous raw materials kyanite (P. A. Borisov) and others. A large part of these deposits is being successfully worked and the other part has been or is being readied for exploitation.

The geologists of the Kola base of the Academy of Science not only discovered or studied these deposits, but of no less importance they were the pioneers for their industrial harnessing and the instigators for the introduction into practice of new types of raw materials which up to then had not been known in the mining industry such as apatite, nepheline, loparite and perovskite.

The proposals of the scientists and prospecting geologists were supported by the governmental and Party organs of the nation. In a formerly uninhabited and wild region there began to develop an ore-dressing and metallurgical industry.

Such were the practical results of the geological discoveries of the field geologists and scientists from the Academy of Science in the prewar period.

Of no less consequence are the scientific results of the research which has been carried out by the Kola base and by the sections of the AN USSR which have worked at the base. Very likely the main role in this work was played by the research on the mineralogy and geochemistry of Khibiny and Lovozer which are the most unique geochemical formations in the earth's crust. During this period the national mineralogy was enriched by the discovery of such new rare-metal minerals as loparite, lovchorrite, romzaite, yuksporite, rinkite, fersmanite and others. It was established that many rare minerals or minerals which earlier did not have industrial significance are found in the Khirbin and Lovozer mountains in concentrations of commercial significance. The basic features for the geochemistry of alkali magmas were established. In the geochemical laboratory of the Kola base (B. N. Melent'yev, I. D. Borneman-Starynkevich) they carried out numerous chemical analyses of the new minerals which often had a complex composition, and analyses of the apatite-nepheline ores. They also researched the distribution of the rare elements such as fluorine and strontium in the ores and rocks of the Khirbin mountains.

The mineral and geochemical works of those years were published in the eight collections of works of the Kola base, and also in a summary work Mineraly Khibinskikh i Lovozerskikh tundr /Minerals of the Khibin and Lovozer Tundras/.

On the 10th anniversary of the Kola base of the AN USSR(1940) the Academician, A. Ye. Fersman gave a general summary of all the mineralogical data for the Kola Peninsula which had been gathered by the geological expeditions from the various ministries and scientific sections of the Academy of Science. This work has received high praise from the scientific community and up to now is the major general work on the geochemistry and minerals of the Kola Peninsula and a reference work for every geologist.

During the postwar period the geological research was significantly expanded. The geologists of the Kola Affiliate continued to study the mineralogy and geology of the individual mineral deposits in the Kola Peninsula and as well research on various geological complexes (the Keyv and Imandra-Varzuga formations, alkali granites) and individual regions.

A major work was begun in 1947 by a collective of researchers from the Affiliate (Ye. K. Kozlov, G. I. Gorbunov) on the ultrabasic rocks and in connection with them on the copper-nickel deposits in the strip of the so-called "non-ferrous belt" /tsvetnoy poyas/. The work was carried out in cooperation with the laboratory of pre-Cambrian geology of the AN USSR and directed by the Corresponding Member of the AN USSR N. A. Yeliseyev. The results of the study on the petrology of the ultra-basic massifs and copper-nickel mineralization permitted us to recommend further geological prospecting in the Monchegorskiy rayon /Moncha Mountain region/ (Ye. K. Kozlov). Under the direction of Ye. K. Kozlov they studied the main massifs of ultra-basic rocks (Moncha, Lovnos, Zasteyd-II, Fedorova tundra, etc.), and established the main features of the metalliferous intrusions.

The co-workers of the Kola Affiliate and the workers of the Ministry of Non-Ferrous Metallurgy after the Great Patriotic War began research on the geological structure and composition of the ore fields in the copper-nickel deposits of Pechenga, and on the mineralogy of the deposits, the petrography of the ultra-basic rocks and the intervening strata mineralization. They established that the Pechenga district is a major basin for copper-nickel mineralization in the country.

The results of the research on the copper-nickel deposits were published in a number of monographs (Ul'traosnovnyye i osnovnyye intruzii i sul'fidnyye medno-nikelevyye mestorozhdeniya Pechengi /The Ultra-basic and Basic Intrusions and the Sulfide Copper-Nickel Deposits of Pechenga/, 1952; Ul'traosnovnyye i osnovnyye intruzii i sul'fidnyye medno-nikelevyye mestorozhdeniya Monchi /Ultra-basic and Basic Intrusions and Sulfide Copper-Nickel Deposits of Moncha/, 1953; Geologiya i rudnyye mestorozhdeniya Monchegorskogo plutona /The Geology and Ore Deposits of Moncha Mountains Plutonium/, 1956).

Much work is going on in the Kola Affiliate on research in the geology of the apatite-nepheline deposits, the composition of the ore, the technology for reprocessing it, and the technical and economic bases for the future complex use of the ores.

Regardless of the almost 30-year history of studying the Khirbin Mountains there are still many unstudied problems in geology, mineralogy, and geochemistry of this region. Suffice it to say that every year they are always discovering new and formerly unknown geological phenomena (the separation of fuel gases with a methane composition in the alkali rocks, the powerful development of the erosion crust, new minerals, etc.). The Affiliate has conducted a monographic study of a number of the Khirbin minerals. A. F. Mikhaylova has studied the the sphenes of the Khirbins, and S. S. Kurbatov has worked on the mineralogy of/ mine imeni S. M. Kirov and the Rasvumchorrskiy deposit. These works have been of great use in calculating the reserves of the deposits and for working out new methods for a higher extraction of apatite and nepheline in the process of dressing them.

Mineralogical research on the destroyed zones and the linear erosion crust (D. M. Dorfman) has shown the extensive development in

the erosion processes in the Khirbins which have penetrated to significant depths along the fracture zones. Here they have established a number of new and formerly unknown minerals such as potassium cyrcite $K_2O \cdot 0.8\ CaO \cdot ZrO_2 \cdot 5.6\ SiO_2 \cdot 4H_2O$, cyrcite $(Na,K)_2O \cdot CaO -- ZrO_2 \cdot 4SiO_2 \cdot 3.2H_2O$, ferrichinglucuite, mangachinglusuite, natrohisingerite and others.

The petrological and structural study of the little studied deposits which in the near future should be exploited such as Kuel'por, Poachvumchorr, N'yurkpakhk, Suoluayv, Koashva have made it possible to separate (T. N. Ivanova) two sharply different types of apatite-nepheline deposits--the so-called magmatic and the pheumatolyte-hydrothermal.

The geologists of the Affiliate (A. A. Chumakov, I. V. Ginzburg, A. F. Sosedko, A. M. Ivanov) are extensively studying the alkali granites of the Peninsula which here are a more widely distributed complex and to a significant degree determine the geological history and the distribution along with them of the rare-metal mineral deposits. This research has permitted the discovery of a whole area of rare-metal pergmatite where they are now conducting extensive geological prospecting. Already the first results of the prospecting (A. G. Zinov'yev) have shown enormous reserves of various rare elements in the pergmatite bodies. The work is going on in close creative cooperation between the Affiliate and the North-Western Geological Administration and in accordance with a unified plan.

The discovery of the rare-metal pergmatite in the Kola Peninsula is the most significant achievement of the geologists in the postwar period. It opens up new prospects for exploration and geological prospecting in the northern part of the Baltic shield.

In recent years the Affiliate has begun a study on the geology and the quaternary cover and also the porous deposits which cover the pre-Cambrian crystalic base. The Affiliate's discovery (A. V. Sidorenko) of a post-glacial erosion crust and postglacial continental deposits establishes the genetic link between the strata of the crystallic base and the porous covering, and it opens new prospects for exploration on the Kola Peninsula for alluvial deposits and deposits of the erosion crust type.

The Geological Institute of the Affiliate is also developing in the lithological area in studying the sedimentary-metamorphic strata of the pre-Cambrian era which compose the Peninsula (A. V. Sidorenko, A. K. Simon, A. M. Ivanov).

In recent years, much attention has been given to complex research on the natural resources in the eastern part of the Kola Peninsula which have been much less studied and almost untapped. A group of geologists (I. V. Bel'kov, D. D. Mirskaya, I. D. Batiyeva) has conducted a careful study of the stratigraphy of the kyanites in the Keyv formations. This has permitted a detailed study of the region's structure and has shown the complete applicability of lithological methods of mapping for the sedimentary-metamorphic strata. The results of this research is being published in the form of a monograph.

Geological prospecting has established that in the east of the Peninsula there is a major and practically inexhaustible source of raw materials for obtaining alumosilicate alloys (silumin) and high quality refractory materials. Economic calculations in the Affiliate have shown that it would be completely profitable to organize in this part of the Peninsula an ore-extracting enterprise for reprocessing kyanite. It was proven (M. K. Mazurov) that the production of silumin from kyanite simplifies the technological system for obtaining aluminum alloys, reduces their net cost by 15-20%, and raises labor productivity from 25 to 50%; it lowers by almost two times the specific captial investments per ton of finished product. The limitless reserves of the deposits and the new and more simple technology provide the possibility of sharply increasing the production of silumin for the aviation and automotive industries, for transportation construction and shipbuilding. The high durability of the refractory materials which are obtained from the Keiv kyanites permits not only a sharp intesification of the metallurgical process, but it increases by two times the length of time between repairs on the linings of the metallurgical furnaces.

At present the Affiliate collective in collaboration with the representatives of the scientific-research institutions and the departments in accordance with the instructions of the USSR Gosplan are preparing a technical-economic report on the prospects for exploiting the minerals in the eastern part of the Peninsula.

The world practices for enriching ores usually will not be bothered with such a complicated and complex mineral raw material as are the apatite-nepheline, perovskite, loparite and titano-magnetite ores in the Kola Peninsula. For working out the methods for dressing such ores and for assisting the dressing plants in the area of the Kola Peninsula, in 1956 the Affiliate created a laboratory for mineral dressing (F. N. Belash, director).

The laboratory (M. A. Aleynikov) has done research and then tested at the Kirov Concentrating Plant mixtures of unsaturated aliphatic and resin acids (talloleic oil) for the flotation of apatite, magnetite, hematite and perovskite. It was shown that this oil is a satisfactory collector while only using a small amount of it for the flotation process.

The laboratory has worked out and tested under pilot plant conditions a system of flotation for hematite and magnetite from the tails of magnetic-gravitational dressing of the ferrous quartzite in the Olenegorskiy Plant. Basically it rests on the action of weak solutions of sulfuric acid on mineral pulp granules which have been preliminarily concentrated by the collector. This method for the flotation of hematite and magnetite is being recommended for introduction at the Olenegorskiy Concentrating Plant.

A large part of the Affiliate's research is given to working out the methods of chemical technology for reprocessing the mineral raw materials of the Peninsula. Even in the first years after the war B. N. Melent'yev jointly with the workers from the "Apatite" Combine

(S. K. Kel'manzon) proposed a method for obtaining a new type of phosphoric fertilizers which were fused magnesium phosphates from the apatites of the Khibins and from the olivinites of Khabozero.

A group of co-workers under the direction of Ya. G. Goroshchenko is working on the questions involved in the complex reprocessing of the rare-metal ores. They have proposed a sulfuric acid method of complex reprocessing for the loparite concentrate (Ya. G. Goroshchenko, V. I. Belokoskov). The method is based on disintegration of the concentrate by fusing it with ammonium sulfate and sulfuric acid with the subsequent separation of the titanium from the niobium and tantalium by salting out the ammonium sulfate.

An analogous method has been worked out for obtaining molar titanium dioxide from the perovskite concentrate with the concomitant extraction of niobium, tantalium and rare earths (Ya. G. Goroshchenko, D. L. Motov). The introduction of this method into production has brought about the solution to the difficult problem of reprocessing the perovskite concentrate with the utilization of all the mineral components which it contains.

The have proposed a method for obtaining zirconium dioxide from eudalite concentrate with a small amount of sulfuric acid (12 tons for one ton of dioxide), and in its net cost it is not higher than extraction from zirconium concentrate.

Due to the peculiar features in geological composition of the Kola Peninsula, the Murmanskaya oblast' is almost without such ordinary building materials as clay, quartz sand, limestone, materials for cement production and other binders, etc. The laboratory for construction materials of the Affiliate (D. D. Tenner, director) has concentrated its efforts on discovering methods for obtaining inexpensive construction materials from the wastes of the active mining and metallurgical enterprises.

In the course of this year in the Murmanskaya oblast' upon the recommendation of the Affiliate a major plant is being built for the production of silicalcite products with an annual productivity in the first year of up to 60 million standard bricks.

The Affiliate is studying the slag from the metallurgical copper-nickel plants of Monchegorsk and Pechanga which could be used very effectively and comparatively easily in the construction materials industry. Experimental work has established that it is possible to obtain from the molten slag slag cotton and thermocite. Experimental work is now being completed on a semi-industrial arrangement which will provide the source materials for the planning of a large slag conversion plant and the perspective organization on the Kola Peninsula of pre-fabricated home construction from light concrete on the basis of the thermocite. The research which the laboratory has done on granulate slag shows the limestone-slake cements which are obtained from it can find wide use in construction solutions and in the production of wall blocks and other concrete structures which are manufactured under the conditions of hydrothermal working. Thus the metallurgical slags from the copper-

nickel enterprises are not only a valuable raw material for obtaining thermacite but also the most easily realized major source of non-calcinated mineral raw material for the production of binding materials.

The laboratory for construction materials has also established the possibility of obtaining portland cement of good quality from a mixture of unconcentrated low-grade highly flaky limestone with the addition of these same limestones which have been dressed. Now along with the pilot plant testing which is being carried out at "Giprotsement" /State Scientific-Research Institute for Cement/, they are conducting technical and economic research on the proposed method.

The significance of the research which has been conducted by the laboratory on construction materials is not exhausted only by the branches of industry. Research on the slags from the copper-nickel enterprises is of principal interest since the problem of using the slags from non-ferrous metallurgy in the construction materials industry has been generally insufficiently studied. The acuteness of this work is supported by the special enactment of the government on the extensive introduction of slag into the production of construction materials which was passed in 1957. The study of quartz wastes (the products in the concentration of ferrous quartzite) provides the possibility of using them not only in the Kola Peninsula but in other part of the Soviet Union (Krivoy Rog, Kursk Magnetic Anomaly, Northern Kazakhstan). The working out of methods for producing portland cement from low grade limestones is of interest to the other parts of the Soviet Union which do not have high-quality carbonaceous rock.

In the work of the laboratory of hydrology and hydroenergetics much interest is given to research on the major rivers of the northeastern part of the Kola Peninsula in the aim of disclosing the possibilities for utilizing their energy and also in compiling an inventory of the bodies of water in the Murmanskaya oblast'.

New exact cartographic data on the Kola Peninsula has permitted the compilation of a catalog of rivers and lakes with the corresponding illustrated material. More than 110,000 lakes and more than 16,000 various water outlets have been studied. The material gathered has served as the basis for the compilation of a complete cadastral survey for the water and energy resources of the Kola Peninsula rivers. As a result of this the reserves of potenial hydroelectric energy for the Peninsula have been fixed; they are estimated at 2.5 million kw, which significantly increases the earlier estimates which had been drawn up according to far from exact and incomplete data.

Along with this work there has been a systematic study of the individual major rivers in the eastern part of the Peninsula which have almost been ignored in preceeding years; they are: Ponoy, Iokan'ga, Varzina, Drozdovka, Kharlovka, Vostochnaya Litsa. An energy estimate has been made for each of the rivers and basic schemes have been proposed for the energy usage. As a result a new powerful energy region has been clearly designated in the eastern part of the Kola Peninsula.

Work on the study of the energy significance of individual rivers has led the Affiliate to research on the question of their place in the unified Kola energy system and also to the problem of the development of the Kola energy system and its relation to the unified energy system of the USSR.

The accumulated material has led to the publishing of a series of works under the general title Vodnoenergeticheskiye resursy Kol'skogo polyostrova /Water-Energy Resources of the Kola Peninsula/.

The department of mineral raw material economics, along with the technical-economic bases for the use of the Keyv kyanites in the production of alumosilicon alloys and in the refractory industry, as has been noted above, is also working on other problems in the development of the extracting and reprocessing industries of the Murmanskaya oblast'. They are conducting technical and economic research on the complex use of apatite-nepheleine ores which contain in addition to phosphorous and alumina, fluorine, strontium, rare earths, titanium, vanadium, niobium, and alkali components which unfortunately still are not being extracted from these ores and used in the national economy. They are also studying the economic prospects for using the complex titanium raw material (titano-magnetite, perovskite, sphene and loparite concentrates).

Major research in the Kola Affiliate is going on in the field of biology.

The collective of co-workers in the Polar-Alpine Botanical Garden (B. N. Gorodkov, A. I. Poyarkova, O. I. Kuzenova, R. N. Shlyakov, N. A. Avrorin, N. I. Orlova, Ye. G. Chernov, N. Z. Semenova-Tyan'-Shanskaya) as the result of critical studies on the local herbaceous material of the garden and the live plants in nature, and also of the very rich herbarium collections of the Botanical Institute Imeni V. L. Komarov and the extensive Soviet and foreign literature is compiling a five-volume collection Flora Murmanskoy oblasti /Flora of the Murmanskaya Oblast'/ and Sosudistyye rasteniya /Succulents/. Three of its volumes including descriptions of 36 families, 181 genera and 562 species were published in 1953-1956, and merited high esteem from the Soviet and foreign botanists. Flora is illustrated with original drawings and maps of the specific distribution throughout the oblast'. By 1960 the work on Flora will be completed.

The geobotanical expeditionary research encompasses the significant territory of the Kola Peninsula. As a result they have compiled a map of the vegetation (Ye. G. Chernov) which has gone into the total vegetation map of the USSR. A description of the useful wild plants of the oblast' has been given (R. N. Shlyakhov, 1956).

Annually the Affiliate conducts investigations on the soil covering of the Peninsula and marks out the areas which are suitable for agriculture. As a result of these works soil maps have been drawn up for individual areas and then a summary soil map of the Murmanskaya oblast' on a scale of 1:500000 (I. P. Belov). The latter has become an integral part of the state soil map of the USSR.

On the basis of lengthy massive introduction experiments which include more than 3500 species, some theoretical assumptions have been established for the introduction of plants into the Far North. In the monograph Pereseleniye rasteniy na Polyarnyy Sever /Transplanting Plants to the Polar North/ (N. A. Avronin, 1956) there is an analysis of the behavior of transplanted plants from various geographic origins and the ecological and geographical regular patterns for their acclimatization are established.

From the trees, shrubs and herbaceous plants which have been transplanted by the Garden a large number of valuable decorative species have been found which can adapt to the northern conditions. An accelerated method has been worked out for cultivating shrub seedlings. The cytological and morphological research which has been begun has established the facts on the deep transformation of the kernel apparatus and the plant's morphology as a result of the transplanting.

In order to grow plants and greenery in the cities of Murmanskaya oblast' and the near-by regions of the Far North, an assortment of green plants has been created which includes hundres of species of decorative shrubs, perennials and annuals (T. G. Tamberg). Procedures have been worked out for transplanting full-grown trees (L. N. Goryunova, 1955). The materials from this research and the recommendations have gone into a number of books of N. A. Avronin and T. G. Tamberg.

The Garden conducts an extensive exchange of seeds and dry specimens with botanical gardens and other scientific institutions in the USSR and abroad (about 200 organizations).

The Polar-Alpine Botanical Garden is carrying out much scientific educational work in the oblast' in propagandizing botanical knowledge among the population through the means of organizing excursions, lectures and conversations.

The Murman Biological Station is working on very important scientific and practical problems connectod with the biology of the northern seas. This institution which grew up at the end of the last century in 1935 was transferred to the coast of the Barents Sea (Dal'niye Zelentsy settlement). The Station is conducting work on icthiology, plankton, benthosa, microbiology, hydrobiology,&hydrochemistry in the coastal zone of Eastern Murman.

Since 1953 the Biological Station has been concentrating its efforts on the solution to problems in the fishing industry. In recent years the collective of the Station under the direction of the Doctor of Biological Sciences, M. M. Kamshilov, has rather fully explained the course of the hydrological, hydrochemical and biological processes in the coastal zones. The are studying the factors in the formation and behavior of fish and invertebrates in connection with the biological and hydrochemical conditions. All of this will permit the working out of the scientific bases for a prognosis of the approaches and accumulation of commerical fishes in the coastal zone. It has been established that the approaches of the cod in the coastal area are based chiefly on the spring course of the "moyva" on the spawning. Extensive material has been published on the kolkhoz industry in the coastal

area, and an explanation was given for the regular patterns in the distribution of the cod, herring and "moyva" in the individual seasons and in various years. Great significance was disclosed in the eastern shoals as a feeding area for the commerical fishes.

This year work was begun on a new subject--the influence of industry on the biology and distribution of fish and invertebrates with the aim of giving the theoretical bases for the possibilities of expanding the reproduction of the commercial resources in the waters by the means of transplanting new fishes and useful invertebrates.

A senior worker of the Station, the recently deceased Doctor of Biological Sciences, G. A. Klyuge, compiled a monograph Mshanki severnykh morey SSSR /Bryozoa of the Northern Seas of the USSR/.

The Station has a tie with the commercial organizations and systematically gives to them materials on the hydrology, hydrochemistry and icthiology of the Murman coast and publishes data from industry. The Station publishes its own works.

Such are the basic and chief results of the scientific research of the Kola Affiliate which were begun in the prewar period and which were significantly expanded and deepened in the postwar years. The importance of the work which is being carried out in our collective and its contribution to the development of the economy of Murmanskaya oblast' are undoubted. However the Kola Affiliate, as probably with many others, still cannot be recognized as decisively shaped in accordance with the basic directions in the development of the national economy of our kray. The laboratories and departments of the Affiliate in the majority of instances are understaffed, and in their staff possibilities, financial resources and equipment are worse off not only in comparison with the central scientific institutions, but with the corresponding laboratories in the departmental institutions which are even here on the Kola Peninsula. Work is hindered also by a sharp lack of laboratory and living space.

For the more successful activity of the Affailites of the AN USSR it is necwssary first of all to improve their material-technical supply, the financing of scientific research, and increase the staff of scientific and auxiliary personnel.

SOME RESULTS OF THE SCIENTIFIC RESEARCH IN THE KARELIA AFFILIATE OF THE AN USSR

/Following is the translation of an article by V. S. Slodkevich, in Izvestiya vostochnykh filialov Akademii nauk SSSR, No 8, 1957, pp. 112-116/

The Karelia ASSR /Karel'skaya ASSR/ lies in the north-western part of the USSR and is called "the land of forests, swamps and lakes." The natural wealth, however, includes not only lakes and bodies of water. The territory of Karelia which lies within the limits of the Baltic shield /shchita/ is almost continuously formed from Precambrian and Proterozoic rock with an extensively developed covering of quaternary deposits. The mineral wealth of the Republic (mica, pegmatite, stone construction and facing materials, iron ores, non-ferrous ores, etc.) has been known for a long time. However the study of them and their economic utilization has been carried out one-sidedly and far from completely.

And it was only when the Karelia Affiliate of the AN USSR was set up (from 1945 in the form of a base, and from 1949 as an Affiliate) that studies and inventories were begun on the Republic's natural resources.

At present there are the following institutes in the Affiliate: Forestry, Biology, Language, Literature and History; department of hydrology and water control, economics, geology; a chemical-analysis laboratory, a laboratory of hydrochemistry, the Belomorskaya /White Sea/ Biological Station and the "Kivach" reserve.

In the collective of co-workers in the Affiliate there are 5 doctors of science, 76 candidates of science, 44 scientific workers without an academic degree, and 94 persons in the technical staff.

During its existence the Karelia Affiliate has become an independent scientific-research institution which is capable of solving the tasks which confront it on the necessary theoretical level.

The task of inventoring the natural wealth at present has already been basically fulfilled, and the collective of co-workers is working on the questions of drawing into the national economy and harnessing for extensive industrial use those natural resources which are still not being utilized or utilized insufficiently.

The collective of geologists in the Affiliate during the period of its activity has published in the editions of the AN USSR, VSYeGYeI*,

/* VSYeGYeI = Vsesoyuznoye Geologicheskoye Izdatel'stvo -- All-Union Geological Publishers/

the Leningrad Mining Institute and others. Forty-three works (including 3 monographs) have been published, and articles have been prepared for special collections entitled Materialy po geologii Karelii /Materials on the Geology of Karelia/; two major monographs have been prepared on the subject Chetvertichnaya geologiya Karelii /Quaternary Geology of Karelia/ and Stratigrafiya proterozoya Karelii /Stratigraphy of the Proterozoic Era of Karelia/.

The scientific results of the geological research of the Affiliate may be formulated in the following manner:

1. There has been a detailed study of the geological structure of the region for new pegmatite fields in the northern Lake Ladoga region, the morphology, mineralogy, structure, age and genesis of the area's vein and massive pegmatites, as well as the technology for their ceramic components; there has been an industrial estimate made on the prospected and studied pegmatie deposits. The results of the research were published in a number of articles and used by the Ministry of the Construction Materials Industry of the KASSR /Karelia ASSR/ for the organization of pegmatite mines.

The Karelia ceramic pegmatie is also the subject of two monographic works (P. A. Borisov, Keramicheskiye pegmatity KFSSR /Ceramic Pegmatities of the Karelo-Finnish ASSR/, 1948, and Keramicheskiye pegmatity SSSR i ikh zameniteli /Ceramic Pegmatites of the USSR and Their Substitutes/, 1954).

The monograph Keramicheskiye pegmatity SSSR i ikh zameniteli won the prize of the Presidium of the AN USSR.

2. In participating in the great complex Western Karelia Expedition of the Affiliate on the study of the natural productive forces of Western Karelia, the co-workers of the department made a serious contribution to the understanding of this almost unstudied and little inhabited territory of the Republic; summary geological maps were compiled on the quaternary and basic geology. They also drew up the first summary handbook on the ores and non-mineral ores of Western Karelia with an industrial estimate for the prospects of harnessing the region's natural resources. This material has formed the basis for the plan which the Expedition compiled for harnessing the productive forces of Western Karelia.

3. On the subject "The Stratigraphy of the Proterozoic Era of Karelia," a new stratigraphic scheme has been created for the Proterozoic sedimentary-metamorphic and magmatic formations without which it would be impossible to properly plan for exploratory work. For the first time the marker (basal conglomerate) has been established which determines the border of the Precambrian and lower Proterozoic eras of Karelia.

There has been good documentation for all of the Republic's territory on a new layer in the Proterozoic era (lower and upper Karelia) which has permitted one to plan for the main new directions in mineral exploration; the minerals clearly date according to the research results from the definite facial zones of upper and lower

Karelia. One of the important conclusions of the work on this subject is serving as the new tectonic theses on the composition of the Baltic crystal shield and particular in the Karelia ASSR.

On the subject "The quaternary deposits and the geomorphology of Karelia" the valuable result of the research is the creation of 2 new maps on a scale of 1:500000 (quaternary deposits and geomorphology) for the entire territory of the Republic. On the basis of the summary report from many years' work the maps depict the modern theses on the lithology, stratigraphy, origin, and classification of the quaternary deposits and on the forms and genesis of the Republic's relief.

Methods of pollen and diatom analysis are being extensively used, and the executors of the subject have been able to give the scientific basis for a new treatment of many disputed questions on the quaternary geology of the Republic's territory.

5. On the subject "Carbonaceous rocks of Karelia" for the first time they have worked out the questions on the lithology, stratigraphy, structure and chemism of the carbonaceous (primarily dolomite) rock of southern Karelia. The origin for these rocks has been proven to be the dolomite itself; this is in opposition to the earlier theses on the metamorphic genesis of the Karelia dolomite rock by the means of the so-called "dolomitazation" of limestone. The classification has been worked out for the upper-Karelia carbonaceous rock in relation to the calcium and magnesium, and they have studied their technology as a raw material for the production of dolomite binding materials.

6. For several years the Affiliate's geologists in cooperation with the prospectors of the North-Western Geological Administration have been conducting research on the geology and genesis of the Yelet'-ozerskiy deposits of titanium (ilmenite) ores, and now the first important results have been obtained from the study of the geological structure of the ore fields, also on the polyhedricity of the magmatic instrusive activity in the region of Yelet'ozero /lake/, and on the consequence of the ore formation itself.

7. In addition to the scientific research subjects, a great deal of technological research has been carried out by the laboratory for the technology of non-mineral raw materials under the department of geology.

Thus, there was a detailed study of the new Ladoga pegmatites as a source of quartz-feldspar raw material for the porcelain industry. They have worked cut the question of the technological properties for the basic Karelia clays (lake and marine) and they have experimentally proved that it is possible to obtain from them various rough ceramic-wares. The work of the laboratory is also being devoted to the question of the Karelia carbonaceous rock as a rich raw material for the production of high quality dolomite normal lime and hydraulic binding materials.

In fulfilling the enactment of the Council of Ministers USSR, the Institute of Biology of the Affiliate has conducted major research on the peat bogs, and at present has finished compiling a cadastrial plan of the Republic's swamps with a map on the scale of 1:600000.

In all they have disclosed 7718 peat bog systems with a general area of 3,101,300 hectares. The general area of the peat bogs in Category C_2 is 3,500,000 hectares (geological estimate).

In addition a detailed inventory has been conducted of 380 peat bogs which are very rich in their natural fertility and consequently can be recommended for agricultural use.

One of the major works of the Institute of Biology is an injection method which has been worked out by I. A. Petrov. This method makes it possible to change the nature of grain culture. In essence it consists of using an injection needle to inject a grain from the endosperm of one type, species or genus of grain culture into the endosperm of another type, species or genus. The injection is made at the root during the phase of lactose maturity in the grain, and as a result provides the opportunity of overcoming the "inbreedability" between wheat and oats, between barley and wheat, between rye and barley, etc. By using this method, I. A. Petrov has produced several hundred new varieties of wheat, barley and rye which over a number of years are being studied on an experimental basis in the aim of disclosing in detail their useful features. This method is successful in turning summer wheat into winter wheat and winter wheat into summer, or to give a corresponding coloration to the spike and grain, and to strengthen the resistance to diseases, etc.

The sector for animal husbandry in the Institute of Biology has worked out a method for chemically preserving feeds with the assistance of an "I. B-2" preparation which consists of a mixture of aqueous solutions of sulfuric and hydrochloric acids (1 liter of the preparation contains 350g of H_2O_4 and 255g of HCl).

The method of chemically preserving green fodder has very great significance for the practice of agriculture in the Republic. In 1956, in the aim of testing this method more than 4000 tons of green bulk foods were preserved in the sovkhozes and kolkhozes of the Republic.

The co-workers in the sector of zoology have worked out a natural-scientific basis for the organization of a rational fish industry in the Syamozerskaya group of lakes. As a result of this research it was possible to establish the condition of the reserves of valuable commercial fishes and to set a group of measures which when applied would permit not only the restoration but as well a significant increase in fish production in Syamozero /Syam Lake/.

In the area of ichthyology of the Karelia ASSR, a major contribution are the works of I. F. Pravdin and particularly his large monograph devoted to a description of the whitefish family; this work won the prize of the Presidium of the AN USSR.

The co-workers at the Belomorskaya Biological Station are conducting major complex research on the White Sea. Recently there was published a volume of the Affiliate's works which contains new material on the hydrology, hydrobiology and ichthyology of the White Sea; this is of great scientific and practical interest. The book Materialy k sostavleniyu promyslovoy karty Belogo morya /Materials for the

Compilation of an Industries Map for the White Sea/ is now being printed and is soon to be published; it contains the results of many years' research conducted by the Belomorskaya Station.

The interior waters of Karelia--its rivers and particularly the lakes--play an exceptionally large role in the economy of the Karelia ASSR. Therefore the study of the water resources of Karelia and the problem of their use has been given a prominent place in the Affiliate's research plan. The department of hydrology and water control has conducted a planned inventory of Karelia waters, and has compiled exhaustive catalogs of the rivers and lakes; on the basis of these they have made a water energy cadastrial plan which has received wide recognition. The catalog of lakes and the water energy cadastrial plan has also won the Prize of the Presidium of the AN USSR.

Primary attention has been devoted to a systematic study of the lakes of Karelia. Research on the large lakes has been conducted on a complex basis; their hydrological and biological study has been combined with hydrobiological, ichthyological and fishing studies. In recent years the limnological research of the Affiliate has taken on a more penetrating character. The materials from the catalogs and research on individual bodies of water have permitted us to move on to a typological study of the lakes and to establishing the hydrological types of lakes in general. The problem of the hydrological typology of the lakes is becoming a leading one in the work of the Affiliate and its department of hydrology.

A study has been begun on the hydrological role of the forests in the northern conditions, and particular in Karelia. This is a problem of national significance.

With the organization of the department of hydrology of the Affiliate, its work plan has had included in it questions on energetics. The most significant research in this field may be said to be the working out of the problems of electric power supply for the lumber milling industry in Karelia. In addition another problem is the scientific basis for creating a unified Karelia energy system which should be united with the energy system of the European part of the USSR. By this work on the extensive field and its further development (the compilation of the energy-fuel balance for the Karelia ASSR), the Affiliate has been included in the solution to the most important all-Academy problem.

Considering the ever-growing significance of the lumber milling and cellulose-paper industry in the Republic, an Institute for Forestry has been organized on the basis of the existing department of forestry and certain other sectors and laboratories. In the near future it will devote its activity to a study of the theoretical bases for raising and the most rational use of the very rich forest resources of the Republic.

Major works on the study of the history and culture of the peoples of Karelia are being carried on by the collective of scientific co-workers in the Institute of Language, Literature and History. The main attention of the historians at present is focused on the creation of a

summary two-volume work on the history of Karelia and on deeper research on the little studied problems of the history of the kray (the ethnogenesis of the Karelia people, the history of the kray's peasantry, the history of the Republic during the Soviet period, etc.). In all of these areas the first important results have already been attained. Collections of documents and monographs have been published on the earliest history of the Kray, on the history of peasant uprisings in the feudal period, and research is being conducted on the archeological monuments. In 1957, the first volume is to be published of Ocherki istorii Karelii /Outlines of the History of Karelia/ which is devoted to the history of the kray from the earliest times to the Great October Socialist Revolution. As well several works will be published on the history of the founding and strengthening of Soviet power in Karelia in 1917-1918. The Institute has published and received wide renown in science and among readers for the numerous collections of folk works which were written in the Republic's territory (tales, bylinas /epics/ and runes); among them are a collection of selected Karelia runes and a series of popular booklets Biblioteka fol'klora /Folklore Library/. Monographs have been published which are devoted to individual problems in folklore such as: Narodnaya slovsenost' Karelii /Folk Sayings of Karelia/, Iz istorii russkoy fol'kloristiki /From the History of Russian Folkloristics/, and Narodnaya poetessa Irina Fedosova /The Folk Poetess Irina Fedosova/. Work has been completed on the major work Istoricheskiy osnovy karelo-finskogo eposa /Historical Bases of the Karelo-Finnish Epos/ in two parts, the first book of which will be published in 1957. In recent years a start has also been made in the study of Soviet literature in the Republic and the literature of Finland. The basic attention of the linguists of the Institute is concentrated on the study of the unwritten languages of the Republic's peoples--the Karelian and Vep tongues. This research has important significance in understanding the history of the languages and the history of the peoples of Karelia. Work has been completed on and they are now publishing a study work of many years Dialektologicheskiy atlas karel'skogo yazyka /Dialectological Atlas of the Karelian Language/. Dialect dictionaries and other materials are being prepared. A Finish-Russian dictionary has been published and work is being completed on a large Russian-Finish dictionary. The Institute yearly conducts archeological, ethnographic, folklore and linguistic expeditions in the aim of studying and collecting the very rich materials on the history and culture of the peoples in the Republic.

Such is the cursory and extremely incomplete list of the works which have been conducted in the last years by the collective of scientific co-workers at the Karelia Affiliate. Nevertheless from this list it is evident that the Affiliate's scientists have been able to select the most important problems which are of primary scientific and economic importance, and have obtained fine successes in their studies.

In connection with the reorganization of the management of industry and the national economy and the creation of an independent economic region on the Republic's territory, the role of all the

scientific subdivisions in the Affiliate and its significance in the question of the further rapid development of the culture and national economy will grow immesurably. The Affiliate must become now a large scientific centers which coordinates and directs the research work which is carried on in the Republic by all the scientific-research organizations and institutions of higher learning.

THE SCIENTIFIC ACTIVITY OF THE KOMI AFFILIATE OF THE AN USSR

/Following is the translation of an article by P. P. Vavilov, in Izvestiya vostochnykh filialov Akademii nauk SSSR, No 8, 1957, pp. 117-125.

The Komi ASSR which in the past was on the borderlands of Tsarist Russia has at present been turned into a powerful fuel-energy base for the European North of the USSR and the most important lumbering region in the nation.

In the Republic enormous reserves of hard coal have been discovered which are almost two times more than in the Donbas. Here is concentrated more than 15% of all the forest resources of the European part of the USSR; the exploitation of their reserves has reached 2 billion cubic meters, and of this 85% is being fell from mature and overmature timber.

The leading significance in the economy of the Komi Republic has been taken over by heavy industry and first of all the fields of coal mining, forestry, petroleum and carbon black production. Along with these fields there has been great development in their ancilary fields of energetics, metal working, building materials production and also transportation and agriculture.

In 1956 the Republic mined 15.4 million tons of coal, 1.13 billion cubic meters of natural gas, fell 12.9 million cubic meters of forest, produced 810 million kilowatt hours of electric power, 1,100,000 cubic meters of lumber, 30,600 cubic meters of plywood, and 40,000 tons of carbon black.

The significant development in the Republic's industry, the growth of the cities and the increase in the population are posing numerous and important scientific problems which should particularly concern the Komi Affiliate of the AN USSR which is still the sole complex scientific institution in the enormous territory of the north-eastern part of European USSR.

The Komi Affiliate of the AN USSR was organized in 1944, however the beginning of its scientific activity dates from as early as 1941 when in the city of Syktyvkar as a result of the temporary unification of the Kola and Northern bases of the AN USSR which had been evacuated to there, there was created a base of the AN USSR for the study of the north. From 1944 (after the re-evacuation of the Kola base) it became the Scientific-research base of the AN USSR in the Komi ASSR, and in 1949, it was renamed the Komi Affiliate of the AN USSR.

At the time of the organization of the Scientific-research base only 25 scientific co-workers were employed there, including one doctor and 15 candidates of science. At present the Affiliate has more than 100 scientific workers with 3 doctors and 40 candidates of science; 17 of the candidates of science come from the Komi people. During the existence of the base and Affiliate and in the course of graduate study and as part of the graduate training the scientific co-workers and graduate students have defended 3 doctoral and 36 candidates disserations, and about 10 dandidates' disserations are being prepared for defense.

At present the Affiliate is composed of 8 departments: geology, soil science, forestry, plant biology, animal biology, economics, energetics and water control, language, literature and history. In addition the Affiliate has a biological station (Vil'gort settlement) and several laboratories (geochemical, soil chemistry, biochemical, spectral analysis, thermic and mineralogical) which serve the departments. A good library has been created.

In the period since 1952, 6 collections of Trudy /Works/ of the Affiliate have been published as well as 5 collections of Izvestiya /Prodeedings/ of the Komi department of the All-Union Geographical Society which has been organized within the Affiliate. In recent years numerous works, collections and pamphlets have been published. In the last five years the printed scientific output of the Affiliate covers about 700 printed pages.

The collective of the Komi Affiliate of the AN USSR has done important work on the study of the productive forces of the Republic, and also on the working out of problems in the language, literature and history of the Komi people.

The Geological Department headed by the senior researcher of the European North and honored scientist of the RSFSR, A. A. Chernov, has concentrated its research chiefly on the oblast' of the Northern Urals which forms part of the Komi Republic under the name of the Pechorskiye Urals. The central portion of the latter is formed by complicated and complex very ancient metamorphic rock which are broken up by intrusions of various magmas. In this complex they have carried out research on the granite massiv of Il'ya-iz in Verkhov'yakh Podcherema, the Sabli range , and the intrusions in the basins B. and M. Patokov and also the Torgovsk rare-metal deposits. A work has been prepared and published entitled Geologicheskoye stroyeniye i gornyye porody khrebta Sabli (Pripolyarnyy Ural) /The Geological Composition and Rocks of the Sabli Range (The Arctic Urals)/.

From the Silurian deposits which are widely spread on the Pechorskiye Urals, a study has been made on the deposits of polymetals in the Ilycha Basin. A description of these deposits is given in the work Medno-svintsovo-tsinkovyye mestorozhdeniya na r. Ilych /The Copper Lead and Zinc Deposits on the Ilych River/ which is at present being published by the Publishing House of the AN USSR.

Research on the Devonian basins of the Shchugora and Podcherema Rivers has made it possible to produce a large summary work Strati-

grafiya i litologiya devonskikh otlozheniy Sredney Pechory /Stratigraphy and Lithology of the Devonian Deposits of Central Pechora/ which has received good reviews by the specialists. There has been a study also of Devonian period in the southern part of Chernyshev Range and research /the has begun on its northern part. From the practical viewpoint the Devonian deposits are of interest due to the bitumen found in them.

The coal deposits of the Urals are being studied under the direction of V. A. Varsanof'yeva. In the basin of the Upper Pechora, V. A. Varsanof'yeva has been working for a number of years and at present is publishing the materials which she has gathered. In the basin of the Middle Pechora they are conducting research on the Podcherema and Shchugor Rivers. Work has been completed in the southern part of the Chernyshev Range. From a practical viewpoint the carbon is of interest for the major gas and oil deposits which are found in it and also due to the presence of workable coal veins in its lower section.

They are conducting research on the Permain deposits of the Urals and Ural area. It has been established that the lower Permian period was formed by marine phases and the upper by continental. The latter contains a rich flora and the study of them has disclosed many new forms. Of greatest practical interest are the oil beds, although these are secondary fields but do have industrial possibilities.

A study has been made on the quaternary deposits in the Middle and Upper Pechora. The scale of work here is clearly insufficient in connection with the intended construction of the Kamsko-Pechorsko-Vychegoskiy man-made reservoir and the flooding of the enormous areas of quaternary strata.

In Timan research was concentrated primarily in the field of the distribution of the Devonian and coal deposits. The study of the structure of the Pechorskoya Pizhma has permitted us to establish the gold bearing features of the Devonian conglomerates.

One must mention the work in the extensive oblast' of the Russian plateau which stretches to the west from Timan. Here in the basin of the Mezeni River (Udorskiy rayon) during the war years there was found (M. A. Plotnikov) a large group of salt sources of a unique composition and with a comparatively high content of sodium sulfite. However the Northern Geological Administration has drilled only near Seregovo settlement on the Vymi. Regardless of the fact that a large boss of rock salt was discovered with signs of potassium salts, the drilling was carried on only to a depth of 350 meters and then stopped.

Signs of bitumen were discovered in the Permian deposits of Northern Kel'tma, but here the drilling work was not carried out to the end in spite of the good results from the prospecting.

Research has been done on the genesis of the siderite ores in the basin of the Sysola and also on the quaternary deposits of this basin and the basin fo the Northern Kel'tma.

Finally one must note than the small collective of geologists at the Affiliate has compiled the first summary of the geological structure of the Republic and its minerals which has been published in

the first volume of the monograph Proizvoditel'nyye sily Komi ASSR /The Productive Forces of the Komi ASSR/ (1953, 36 pp. with appended geological and mineral maps on the scale on 1:1000000). The work has received good reviews from the specialists and has received the Prize of the Presidium of the AN USSR.

A systematic study of the soil covering of the Komi ASSR was begun in 1942. The basic direction of the work in the Department of Soil Science has been with geographical and genetic research.

At present in the soil field there has been a study made of about 42% of the territory of the Komi Republic. Research is going on first of all on the southern and more worked region with an estimation of their prospects for agricultural development. A soil map has been drawn up for this territory on a scale of 1:500000, and also soil maps of 1:300000 and 1:200000 for the Ukhtinskiy, Storozhevskiy, Udorskiy, parts of the Ust'-Vymskiy, Troitsko-Pechorskiy and Intinskiy rayons of the Komi ASSR. Soil maps have been compiled for the 10-kilometer strip along the Pechora Railroad. A summary soil map has been compiled for the territory of the entire republic on a scale of 1:1500000. The work Pochvy Komi ASSR /Soils of the Komi ASSR/ is being printed (12 pp.) which gives the basic regular patterns in the development of the soils, their systematism with the corresponding characteristics of the separate types, subtypes and species of soils, and an agricultural production estimate has been made for the Republic's soils.

At present soil research is being conducted on the territory of the Pechora industrial region in connection with a complex study of the productive forces in this region.

Along with the soil and geographical discoveries, the Affiliate is conducting experimental work on the scientific basis for applying individual agricultural procedures for increasing the fertility of the podzolic soils. Thus, data has been obtained on the influence of the perennial grasses on the fertility of these soils and the means have been worked out for the rational use of the grass beds under the conditions of the southern and middle parts of the Komi ASSR. They are publishing the nourishing regime of the podzolic soils in pure and live steam in the aim of disclosing the effectiveness of the live steam in the Republic. Work has begun on the microbiological properties of various soils.

The Affiliate's Department of Soil Science maintains a permanent link with the Soil Institute of the AN USSR Imeni V. A. Dokychayev. Upon the request of the Institute, the Department participated in compiling the State Soil Map of the USSR (page R-39).

A systematic study of the vegetation of the Komi ASSR including the forests was begun by the Affiliate in 1942. The research of the Department of Forestry has been concentrated on the questions of restoring the forests in concentrated felling under the conditions of modern mechanization in lumbering, on the classification of forest types and their lumbering characteristics and also on the questions of flooding and draining the felling areas.

Work has been conducted in many of the forest kolkhozes of the Komi ASSR in various subzones of the tayga.

On the basis of the materials which describe the vegetation of the individual rayons of the Komi ASSR at present they have been able to disclose the regular patterns in the distribution and development of the forests, their typological composition, etc.

The results of the study on the natural reforestation in the felled areas, the influence of the soil conditions on reforestation, the changes in the properties of the soils and the processes of inundation in connection with felling have provided the opportunity of proposing several measures for restoring the more valuable types of forests.

A large part of the work conducted by the Department of Forestry has been given to research on the lumber raw materials for the developing lumber industry.

The results of the study of the vegetation covering in connection with the physico-geographical conditions have been written up and published in 1955 in the monograph Rastitel'nyy mir Komi ASSR /The Vegetation World in the Komi ASSR/ (30 pp.) with an appended map of the Republic's vegetation, and partially also in the work Klimat i vechnaya merzlota /Climate and the Permafreeze/. In addition the results of the forest soil and other research have been published in more than 30 articles and pamphlets. In recent years the collective of the Department of Forestry along with its expeditionary and stationary research on the forests has been compiling a monograph on the forests and lumbering industry in the Komi ASSR and a handbook of higher plants of the Republic.

It should be noted that the co-workers of the Department are working on many questions in forestry in cooperation with the workers from the Administration of Forestry of the Komi ASSR. This greatly facilitates the introuction of the scientific achievements into production.

The Department of Biology of the Komi Affiliate of the AN USSR as early as 1940-1941 began a study of the Republic's fauna. In 1953 there was published the first collected work Zhivotnyy mir Komi ASSR /The Animal World of the Komi ASSR/ (21 pp.). It was written by a group of authors and includes more than 1000 species of animals, although this is far from exhausting the composition of the Republic's fauna. The vetebrates have in the majority already been disclosed and among the invertebrates only a few groups have been studied more completely (the fauna from the bodies of water, and particularly the terrestial entomofauna and primarily the agricultural pests), although even for them the list of recorded species annually has new additions made to it. Thus in just the past 4 years about 1000 additionalspecies of insects, oligochaetes, rotifera, mollusks, etc. have been described.

For a number of year work has been going on on an ichthyological and hydrobiological study of the most important bodies of water in the basins of the Pechora, Bychegda and Mezeni rivers including their tri-

butaries and lakes. In 1953, there was published the collected work (19.5 pp.) Ryby i rybnyy promysel srednego i nizhnego techeniya Pechory /Fishes and Fishing of the Middle and Lower Reaches of the Pechora River/ (O. S. Zvereva, Ye. S. Kuchina, N. A. Ostroumov). A number of subsequent articles of the same and other authors establish the unique ichthyofauna of the bodies of water on the territory of the Republic and its complex conditioning by the hydrochemical and hydrobiological conditions and by the past history of the bodies of water.

Research has been conducted on the hunting and trapping fauna and its changes in connection with the activities of man (felling the forests, the development of industry).

In 1950 under the direction of P. F. Rokitskiy there was begun a study of agricultural animals, their biological and husbandry peculiarities in the various rayons and zones of the Komi ASSR, and the complicated processes of their changes. Much attention is being given to the adaptability of the basic species of agricultural animals (cattle, sheep) under the influence of the various factors of the environment and inheritance.

The Department has traced the evolutionary changes in cattle and sheep on the territory of the Republic and have established the reasons for them. They have taken into consideration the breeding resources in the kolkhoz and sovkhov stock. And jointly with the agronomists, soil scientists, economists and biologists there has been a study made of the problem in transforming the fodder base for animal husbandry.

The results of the research on the biology of agricultural animals have been put into a number of works by P. F. Rokintskiy and other co-workers.

The Department of Animal Biology has made many practical proposals and recommendations for production such as measures for increasing the output of fish on the Vychegda, Pechora, Usa, etc, the strengthening of the trapping industry, the better organization of the trapping industry, the acclimatization of new species of commercial animals (beaver, muskrat), changes in cattle feeding, and the organization of breeding work, etc.

The collective in the Department of Plant Biology has conducted research on the condition of the feed base for animalhusbandry in the southern part of the Komi ASSR. and also in the tundra and forest zones, and has recommended measures for its strengthening. They have studied the biological peculiarities in the fertilization of the perennial feed grasses and have worked out the scientific bases for the organization of the planting.

On the basis of the research on the biological peculiarities in the growth and development of Pechora clover, they have devised the most prospective plans for its planting in the feed crop rotations. The study of the biology of the growth, flowering and fertilization of a number of berry plants under the conditions of cultivating them in the north has enabled us to work out the scientific basis in the procedures for their cultivation.

An effort is being made to systematically introduce and acclimatize arboreal shrubs, annuals and perennials for ornamental use, and they are working on new types of feed, silo and vegetable crops. For all of these plants they have set up a significant acclimatizing nursery which has up to 170 species and more than 600 varieties.

In recent years the agricultural biologists have been investigating the biology in the growth and development of new species of silo crops under the northern conditions. For the most hopeful of the species they have worked out the scientific basis for their cultivation. They have separated a group of plants for dwarfing.

Interesting work is being carried out on vegetable crops. They are studying the biological peculiarities in the growth and fertilization of tomatoes and cucumbers when cultivated in hothouses and under glass. They have disclosed the positive role of the photoperiodic action on the on the starts and the thermic action on the seeds. They have also made a study of the influence of various light systems on the photosynthesis processes in tomato plants.

They have worked out the scientific basis for obtaining early and large harvests of white-headed cabbage by cooling the seeds and the photoperiodic action on the starts and as well the methods for obtaining large harvests of cucumbers and tomatoes under the conditions of the European north east.

Research has been carried out on the basic regular patterns in the growth and development of various species and varieties of potatoes (more than 500) when planted under northern conditions. They have studied the peculiarities in the formation of the harvest and have given the scientific procedures for obtaining under the conditions of the Komi ASSR early (July) harvests of this crop.

From the results of the study on the biology of the growth and development of various groups and species of plants a number of pamphlets and articles have been published in the Trudy of the Komi Affiliate. In addition to this they have prepared for publication the summary monograph Sel'skokhozyaystvennyye rasteniya v Komi ASSR /Agricultural Plants in the Komi ASSR/.

The economic research in the Komi Affiliate of the AN USSR has begun to develop comparatively recently. The Department of Economics is one of the youngest in the Affiliate.

As is well known during the years of socialist construction, the Komi ASSR has become a kray with a highly developed industry. There are particularly rapid rates of development in the Pechora industrial region of the Republic where they have discovered colossal reserves of various mineral and land wealth. At the present time it provides 75% of the industrial production in the Komi ASSR and is taking on ever greater significance in the all-Union balance of fuel and wood.

Proceeding from this the economists of the Affiliate since 1955 have been doing research on the basic directions in the development of industry and transportation in the Pechora industrial region. In doing so they have in mind fundamentally a detailed study of the region's

economy, its inter-branch and inter-rayon connections for planning the means for the complex development of industry and transportation, and to give a projection of the economic development over 15-20 years.

The working out of the questions for the further growth and placement of the most important fields and the determining of the specialization and means for the complex development of the economy are two of the most fundamental directions in the economic research of the Komi Affiliate.

Other very important directions in economic research in the Affiliate are the study of the internal productive resources and in particular the resources for the growth of labor productivity in the industry of the Komi ASSR and especially in coal mining and lumbering.

The concentration of the efforts of the economists on the main and decisive problems of the Republic's national economy, the strengthening of the links with the workers in production (Vorkutaugol'" /Vorkuta Coal/,"Intaugol'" /Inta Coal/,"Komiles" /Komi Forestry/ and Ukhtinskiy Combines) and the joint creative work with them in 1956-1957 has led to some results in research and the prepration of a number of collective important books and pamphlets on the development of industry and labor productivity; they are such works as Ocherki po razvitiyu promyshlennosti Komi ASSR /Outlines on the Development of Industry in the Komi ASSR/, Voprosy povysheniya proizvoditel'nosti truda i snizheniya sebestoimosti uglya aa shakhtakh Pechorskogo basseyna /Questions on Increasing Labor Productivity and Lowering Net Costs for Coal in the Mines of the Pechora Basin/, Problemy razvitiya Pechorskogo ugol'nogo basseyna /Problems in the Development of the Pechora Coal Basin/, and O rezervakh rosta proizvoditel'nosti truda v lespromkhozakh Komi ASSR /On the Reserves for the Growth of Labor Productivity in the Lumbering Kolkhozes of the Komi ASSR/.

From the earlier completed economic works it is possible to point to the following: Sotsialisticheskaya industrializatsiya Komi ASSR /The Socialist Industrialization of the Komi ASSR/, General'naya skhema ispol'zavaniya mestnykh energeticheskikh resursov dlya elektrifikatsii sel'skogo khozyaystva Komi ASSR /The General Scheme for the Use of Local Energy Resources for the Electrification of Agriculture in the Komi ASSR/, and Ekonomicheskaya kharakteristika pechorskikh rayonov, tyagoteyushchikh k zapadnomy varianty Uralo-Pechorskoy zheleznoy dorogi /The Economic Characteristics of the Pechora Rayons Tangential to the Western Alternate Route of the Ural-Pechora Railroad/. They have been given out for use in the interested organizations and institutions.

At present the collective of economists of the Affiliate is continuing the working out of the questions involved in the specialization and complex development of the Pechora industrial region and the study of the resources for the growth of labor productivity which are taking on particularly acute significance in relation to the transformation of the organizational forms for managing industry and construction.

From 1948 to 1952 there was working in the Affiliate a Department of Climatology, which was a comparatively small collective and which

was doing important work on the climate of the Komi Republic. Two monographs were compiled which are individual sections of the general Affiliate monograph Proizvoditel'nyye sily Komi ASSR, and in particular Vol II, Part I "Climate and the Permafrost," (16 pp.); Vol II, Part 2 "Water Resources" (18 pp.). The designated works were published by Publishing House of the AN USSR. In conjunction with the other departments of the Affiliate, the Department of Climatology participated in the compilation of General'naya skhema ispol'zavaniya mestnykh energeticheskikh resursov dlya elektrifikatsii sel'skogo khozyaystva Komi ASSR. This was commended by the Ministry of Agriculture USSR and by the Energetics Institute of the AN USSR.

In 1953 the Department of Climatology was reorganized as the Department of Energetics and Water Control.

The newly created department did research on the conditions for tranferring the lumbering industry in the Vychegda Basin to semi-stationary electric supply. They studied the modern condition of energy control in the enterprises of the coal and oil and gas industry. They are working out the prospects for the development of the local electric power systems which in the future will be taken into the unified energy system of the Republic.

In connection with the planning and exploratory work of the Leningrad Affiliate for Hydro Planning, research was done on the questions involved in the development of the energetics of the Republic and for individual fields of the national economy as a result of the construction of major man-made reservoirs and the energy connection in the Kamsko-Bychegodsko-Pechorskiy complex.

Special energy-economic research was undertaken in 1954-1955 on the fuel-energy resources of the Komi ASSR (Pechora coal, oil and natural gas in the Ukhtinsk oil-gas province, oil shale, wood). They have established the reserves of these resources, their structure, territorial placement, and the qualitative characteristics. In computing the conditioned fuel they have set it at 260 billion tons which makes the Komi ASSR among the territories of the Soviet Union with exceptionally rich power resources. Work on these questions has been conducted by the Affiliate in creative cooperation with the production organizations of the Republic ("Vorkutaugol'", "Intaugol'" and Ukhtinskiy Combines).

In connection with the working out of the problems involved in the development of the Pechora coal basin, the Komi Affiliate of the AN USSR has fulfilled the publishing of a work on the subject Rol' merzlotnykh usloviy v proyektirovanii, stroitel'stve i ekspluatatsii shakht Pechorskogo ugol'nogo basseyna /The Role of the Freezing Conditions in the Planning, Construction and Exploitation of the Mines in the Pechora Coal Basin/. In it they have given the scientific experience in the construction of the Vorkuta, Inta and Khal'mer'yu mines under the specific engineering, geological and hydrogeological conditions which are connected with the presence of permafrost. The work is being prepared for printing.

The Department of Energetics and Water Control has published a number of articles on the questions involved in the description of the fuel resources and their use, on the hydro-energy resources and a description of the river valleys, and also on the problems in the development of forest energetics.

The Department of Language, Literature and History of the Affiliate was created on the base of the Komi Scientific-Research Institute of the Ministry of Education of the Komi ASSR which became part of the Scientific-Research base of the AN USSR in the Komi ASSR in 1944.

A group of co-workers in the Scientific-Research Institute up to 1944 had compiled a grammar of the Komi language for the incomplete /7-year/ and complete /10-year/ middle schools in two volumes which were "Phonetics and Morphology" (Part I) and "Syntax" (Part 2). The appearance of these works was a great step forward in the study of the Komi language. At almost the same time the Russian-Komi dictionary was published. At that time this was of definite importance since throughout the Komi schools then there was a complete absence of any sort of text on the lexicon of the Komi tongue.

In 1941, there was prepared and published the collection Visherskiye pesni i skazki /Visher Songs and Tales/. This was the first folklore collection in the Komi language which shows the richness of the verbal creativeness of the Komi people.

In these same years the Scientific-Research Institute took an active part in the publishing of a two-volume collection of the poetic works of the first Komi democrat-poet, I. A. Kuratov, who lived in the middle of the 19th century.

Thus, the Scientific-Research Institute even before its becoming a part of the Komi base of the AN USSR as the sector of language, literature and history had already conducted well-known work.

In the first years of the sector's existence it had only linguists. The historians, literary men and other specialists appeared later.

In 1948 there was published the Komi-russkiy slovar' /Komi-Russian Dictionary/ which was of significant value for the linguists, teachers, workers in the press, etc. The dictionary was aimed at normalizing and enriching the literary language and it contained nearly 10,000 words. Along with the work on the dictionaries, the co-workers of the department did research on a number of grammatical questions.

Since 1952 the activity of the department has gradually been expanding. It is beginning to encompass other fields of science as well, such as literature, folklore, ethnography and history.

The linguists wrote and published the textbook Sovremennyy komi yazyk /The Contemporary Komi Language/ for teaching VUZes, Part I. This first VUZ textbook on the Komi language in 1954 received the Prize of the Presidium of the AN USSR. The following works have been published: Poryadok slov komi yazyka /Word Order of the Komi Language/, Lingvisticheskiy sbornik /Linguistic Handbook/ (2 and 3 issues); the following has been prepared for sending to the publishers Istoriko-filologicheskiy

sbornik /Historical Philological Handbook/ (4 editions); and the first version of Nauchnyy sintaksis komi yazyka /Scinetific Syntax of the Komi Language/has been finished.

Great attention is being given to the compilation of dictionaries. They have published a Russko-komi terminologicheskiy slovar' /Russian-Komi Terminological Dictionary/, the Orfograficheskiy slovar' /Orthographical Dictionary/; at present the Publishing House of National Dictionaries is editing the Komi-russkiy slovar' /Komi-Russian Dictionary/ of 60-65 pages. At present they are working on the Russko-Komi slovar' /Russian-Komi Dictionary/ and are reworking the Orfograficheskiy slovar'.

Important work has been done by the Department of Language, Literature and History on the study of dialects. The linguists have done research on the northern and western dialects of the Komi language (Izhma, Vym', Udora, Lower Vychegda), as well as the upper Sysol' and Luz dialects. On the basis of the dialect studies the following works have been written: Morfologicheskiye osobennosti verkhnevashskogo govora udorskogo dialekta /Morphological Peculiarities in the Upper Vash Speech of the Udora Dialect/ and Imennyye kategorii vymskogo dialekta /Noun Categories of the Vym' Dialect/. They are preparing for publishing the Sravnitel'nyy slovar' komi dialektov /Comparative Dictionary of the Komi Dialects/ which will be 60-65 pp.

The literary people and folklorists in the Affiliate in this time have published Pesennoye tvorchestvo naroda komi /Song Creations of the Komi People/ (8 pp.), Komi skazki, pesni, poslovitsy /Komi Tales, Songs and Sayings/ (16 pp.), and they are preparing for publication the following works: the collection Komi narodnyye skazki /Komi Folk Tales/ in Russian, Skazki naroda komi /Tales of the Komi People/, one volume of Ocherki po istorii komi literatury /Outlines on the History of Komi Literature/, and the monograph Zhizn' i tvorchestvo Kuratova /Life and Creation of Kuratov/.

The literary people at present are working on the subjects Kuratov i russkaya literatura /Kuratov and Russian Literature/, Zarozhdeniye i stanovleniye komi sovetskoy khudozhestvennoy literatury /The Birth and Development of Komi Soviet Artistic Literature/. The folklorists are working on the subject Fol'klor narodov permskoy gruppy vostochnykh finno-ugrov /Folklore of the Peoples of the Perm Group of Eastern Finno-Ugrovs/.

The historians and ethnographers of the Department have prepared and published in conjunction with the Institute of History AN USSR one volume of Ocherki po istorii Komi ASSR /Outlines on the History of the Komi ASSR/. The second volume at present is being written.

Ethnographic research has been carried out in a number of regions of the Komi Republic. On the basis of the gathered materials they have written the works Etnicheskaya istoriya Pechorskogo kraya /Ethnographic History of the Pechorskiy Kray/, Sovremennoye zhilishche komi naroda /Modern Housing of the Komi People/, and Udorskiye i vymskiy komi /Udora and Vym' Komi/.

In solving the tasks which have been promulgated by the 20th Party Congress, the Komi Affiliate of the AN USSR at present has concentrated its basic forces and funds on solving the problems involved in the further development of the national economy of the northern part of the Republic, and in particular the Pechora industrial region which is rich in various natural resources.

This direction in the research of the Affiliate is completely in keeping with the interests of the further rapid development of industry, transportation and agriculture in the Komi ASSR as a whole. In the study of the questions in the development of the productive forces of the northern part of the Komi Republic, seven out of the eight departments are participating.

Of particular importance in the work of the Affiliate is the research on the question involved in the formation and development of the Komi literary language, literature and folklore of the Komi people, and also the problems in history and ethnography.

The tasks which confront the Komi Affiliate at present and in the future are very great and responsible. There is no doubt that with the maximum concentration of the Affiliate's forces and the constant assistance to it from the Presidium of the AN USSR and the directing organizations of the Komi Republich in improving the technical equipment of the laboratories and in strengthening its personnel, these tasks will be successfully fulfilled.

THE DEVELOPMENT OF SCIENTIFIC RESEARCH IN THE DAGESTAN AFFILIATE AN USSR

/Following is the translation of an article by Kh. I. Amirkhanov in Izvestiya vostochnykh filialov Akademii nauk SSSR, No 8, 1957, pp. 126-129./

The creation in 1947 of the scientific-research base of the AN USSR in Dagestan was a factor of enormous cultural and political significance, and a shining example of the creativeness of the Leninist nationality policy. The organization of the base of the AN USSR in the Republic was a graphic affirmation of the fraternal assistance from the great Russian people.

The research which has been conducted by the Dagestan base (and from September 1949, an Affiliate) encompasses a broad range of pressing problems in the development of the national economy and culture of the Dagestan ASSR. In recent years the Affiliate has solved also important theoretical questions in the field of semiconductor physics.

The results of a number of the research works which have been carried out by the Dagestan Affiliate are being used in production and design organizations both within and outside of the Republic. For example, one might take the determination of the growth of the sedimentary rock and others.

Within the Affiliate there are the following organs: the Institute of Geology, the Institute of History, Language and Literature and four departments: physics, energetics, soil mechanics and the vegetation resources.

At present 271 persons are at work in the Affiliate including 133 scientific workers (5 doctors of science, 50 candidates of science, and 78 junior co-workers without a scientific degree) and 85 people in the auxiliary staff.

The first year of the activity of the Dagestan scientific-research base showed that its development as a scientific center for the Republic was impossible on the basis only of the imported scientific workers. It was necessary to attract specialists from the indigenous nationalities of Dagestan and to be concerned with their scientific growth; without this it would be difficult to count on the correct and rapid solution to the problems which confront the scientific institutions of the Academy.

Therefore much work has been done by the Dagestan Affiliate on training personnel. From 1951 to 1955, 73 graduate students of the

Affiliate have finished and defended their dissertations; they have received their training primarily in the Moscow and Leningrad scientific institutions of the AN USSR. Among the defended dissertations for the completion of a scientific degree of Candidate of Science, more than 95% are works of the indigenous population of Dagestan. Three scientific co-workers of the Affiliate have been awarded the Stalin Prize for outstanding scientific work.

Geological research which has been done in cooperation with the productive organizations has permitted us to establish the presence of industrial amounts of oil in the Mesozoic deposits which up to now have not been considered oil-bearing. This discovery has significantly increased the commercial reserves of oil in the Dagestan ASSR and Chechen-Ingushskaya ASSR, and has made possible a significant increase in oil production in the given regions. The Institute of Geology has compiled geological maps of the tertiary and Mesozoic deposits and a general plan for further geological exploration and drilling work in the oil and gas of Dagestan.

They are working on research also for the development of the extraction of other minerals in the Republic (the deposits of spherosiderites for the creation of a metallurgical industry, etc). For the development of the chemical industry they are conducting research on iodine, bromine, rare and sparse elements. For the construction materials industry they are disclosing the mineral raw materials.

In the field of physics the Affiliate is doing research on semi-conductors and steam thermodynamics and liquids in the critical area with the use of an original measuring instrument which has been designed by a scientist of the Dagestan Affiliate.

The scientific work of the Affiliate has enabled for the first time one to experimentally substantiate the presence of an entire area of a critical state in liquids which has not been shown so far in the existing classical theory.

The scope of the scientific research of the physics laboratory has been significantly expanded in connection with the organization of a cryogenic unit.

The geothermic research which includes the questions of regular patterns of the thermal condition of depths which are accessible for working, the explanation of the genesis and reserves of thermal waters, the securing of superheated water for producing electric energy, and the elaboration of a rational scheme and system for using subterranean heat has laid the basis for utilizing the hot water for complex thermification of cities. This to a significant degree solves the questions regarding fuel supply and water supply with a great savings effect. This research of the Affiliate is already finding wide practical application.

They have carried out as well interesting work on the replacement of expensive solder in the machinery building industry and on the use of spherosiderites as weighting compounds of argillaceous solutions for drilling.

The Dagestan Affiliate has worked out an original mass-spectrometric method for determining the absolute age of geological formations according to the radioactive conversion of potassium 40 into argon 40 with the application of an isotope dilution, and also a method for determining the absolute age of sedimentary rocks. The workers of the Dagestan Affiliate have taken the lead in Soviet science in this field of knowledge.

In the field of energetics significant work has been carried out on the complex use of the energy from the Sulak and Samur Rivers. A study of the resources and the working out of the technical and economic indexes for the construction of a hydroelectric station on the Sulka River has enabled us to establish the possibility of obtaining electric energy from the Sulak of up to 10 billion kilowatt hours per year, and to establish that the hydroelectric stations of Dagestan can participate successfully in the general Caucasian and southern Russian circuits of the unified high-voltage networks. This will provide them with a significant amount of electric energy.

The hydrotechnical laboratory in the Affiliate's department of energetics has worked out a most rational design of an extinguisher through the energy of compressed water. Its design provides for a significant saving in materials, and it has already been accepted by the design organization.

In the field of soil control, in addition to a medium-scale soil map of Dagestan, they have compiled large-scale soil maps for the Tersko-Sulakskaya lowlands which is the basic region for irrigated agriculture. They have also given a monographic description of the soils and their distribution.

They have studied the agrophysical characteristics of the vineyard soils of Dagestan and the influence of various methods of introducing mineral fertilizers on the nutritional system and the harvest of grapes under the conditions of the Dagestan ASSR.

They are now conducting further research on the soils and are working out measures for preventing the deposit of salt in the soil and for increasing the harvest yield of agricultural crops.

For the successful study of the soils of the Dagestan ASSR, the compilation of the soil maps, the publishing of works by the Affiliate's department of soil control and the introduction of the results of the research, the director of the department, A. S. Soldatov, received the Prize of the Presidium of the AN USSR.

The department of the vegetative resources has drawn up a medium-scale map on the vegetation of the Dagestan ASSR with an explanatory text, and has built a large herbarium.

In multi-national Dagestan there is exceptional importance given to the works of the Institute of History, Language and Literature. The materials which have been collected by the archeologists once again bring out a number of important questions in the most ancient history of Dagestan.

The Institute has compiled two-volume outlines on the history of the nationalities of Dagestan from the earliest times to our days,

and the following dictionaries: Russian-Latsk, Russian-Dargin, Russian-Avar, Russian Lezgin, and Russian-Kumyk. They have worked out the phonetics, morphology and grammatical structure of the Avar, Dargin and Lezgin languagues, and have prepared outlines of the Dagestan Soviet literature.

The scientific work in the Institute over recent years has been significantly strengthened. Now more than before they are carrying on more penetrating research on the history, languages and literature. They are successfully conducting archeological work on a large scale which will enable them on the basis of factual material to shed light on a number of questions in the earliest history of the Dagestan peoples. They are beginning to work anew on the question of the study of the Dagestan languages. A comparative historical study has been begun on the languages. The Institute has greatly expanded it research activity, and is becoming the real center of humanitarian sciences in the Republic.

In 1956 the Institute published Uchenyye zapiski /Scientific Comments/ No 1, and two issues of Uchenyye zapiski are being printed. They have published the work Revolyutsionnoye dvizheniye v Dagestane v 1905-1907 gg. /The Revolutionary Movement in Dagestan, 1905-1907/. The Academy of Science Publishing House is putting out the collection of documents which cover 30 printed pages on the subject Borba trudyashchikhsya Dagestana za vlast' Sovetov /The Struggle of the Dagestan Workers for Soviet Power/. In 1957, works are being prepared for publication which cover more than 150 printed pages.

In the aim of the further development in the scientific activity of the Dagestan Affiliate under the new conditions for the management of the national economy, the Presidium of the AN USSR has placed before the Affiliate the following basic tasks:

a) the working out of the problem of the oil and gas potentials in the meso-Cenozoic deposits of Dagestan and its adjacent territories; the study of the geological ores and non-mineral ores; the working out of industrial geological and geophysical data for establishing the regular patterns in the changes of capacity, collecting properties and presence of oil in the meso-Cenozoic deposits; hydrogeological and geothermic research in the aim of utilizing underground hot waters in the national economy; and the working out of methods for determining the absolute age of igneous and sedimentary rock;

b) semiconductor research; the study of the thermal properties of liquids in the critical and transcritical areas;

c) the study of the local energy resources and the working out of the scientific bases for uniting the energy system of Dagestan with other regions of the Norhtern Caucasus.

d) the study of the soil covering according to the soil and climatic zones of Dagestan, and in particular the regions under irrigated cultivation; research on the soil erosion processes in the aim of working out rational methods of combatting them;

e) the study of the flora and vegetation;

f) the working out of questions in industrial economics;

g) working out the questions in the language, literature, history and archeology of Dagestan.

The most important task of the Affiliate at present is its strengthening through leading personnel with higher degrees.

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