D O C U M E N T A T I O N

ACTIVITIES OF THE M. T. A. INSTITUTE DURING 1955

The following basic points have been borne in mind when drawing up the working schedule of the Mineral Research and Exploration Institute for the fiscal year of 1955, viz. :

1. Completion of the geological map of Turkey, on a scale of 1/100,000, showing surface and subsurface geology and structure of the country; this map plays an important part in the mining, agriculture, public works and national defence of Turkey. Preparations to publish this map in sectional maps on a 1/500,000 scale.

2. Priority to coal industry, which plays the most important part in the recovery of Turkey, undergoing presently great developments of rehabilitation.

3. Tackling systematically the major mining provinces of Turkey, insofar as economic geology is concerned.

4. Prospecting of the country for the atomic energy raw materials and strategic minerals, which are receiving today the top priority all over the world.

5. Prospecting for probable gold deposits of Turkey.

6. Assistance to the private mining enterprises, within the scope of our constitutional laws and regulations.

7. Execution of exploratory drilling, mining and estimation of reserves in localities, as required by geological survey program.

8. Researches on the utilization of minerals; particularly of coal, lignites and radioactive minerals, for which special services were created in our Assay and Test Laboratories.

9. Search for underground water and raw materials, necessary for industries such as the cement, glass, foundry, ceramic and nitrogen industries, which are being set up in Turkey.

10. Carrying out of all these prospections and surveys with the up-to-date geological, geophysical, petrographical, mineralogical, paleontological, micropaleontological and chemical methods.

All the staff of the organizational setup of the Institute have mobilized the scientific and technical means, the field and laboratory equipment and supplies, machinery and motor vehicles for the realization of this schedule, the work executed between March and end of December (1955) being as follows :

Geological Mapping

The geological survey for the 1/100,000 scale geological map, covering an area of 15,622 square kilometers and distributed on 444 sectional maps, which will serve as a basis in the studies of natural geography of Turkey, in exploring the underground wealth of the country, in agriculture, public works and national defence, has been completed and plotted in detail on these sectional maps. Furthermore, revision work of 54,622 square kilometers of the 1/100,000 map has also been terminated. Thus, the geological survey

of an area covering 736,161 square kilometers for the 1/100,000 scale map, which was conducted for a number of years, has been completed.

The revision and compilation work of the sectional maps of Konya, Denizli, Diyarbakır and Van, on a scale of 1/500,000, planned under the last year's working program, has been completed and the sectional maps of Kayseri and Sivas commenced.

The data of the survey work on the geological maps of Turkey were submitted and explained to the Symposium of Applied Geology in the Middle East and the Mediterranean Countries, which assembled in Ankara in 1955, and plotting of these data on the World Map scaled at 1/2,000,000 has commenced as per the ruling passed by the International Geological Congress held in Algeria in June 1952.

Coal Geology and Explorations

A. Carboniferous Surveys :

The revision and seam-identification surveys conducted at Kireçlik-Kirenlik-Alacaağzı, in the Coal Basin of Northern Anatolia, have been completed and an underground map of this area has been prepared at a scale of 1/5,000. As a result of these surveys, it has been estimated that the probable reserves are:

29,680,000 tons at the Alacaağzı sector
8,500,000 » at the Tefenli sector
7,900,000 » at the Kirenlik - Kireçlik sector
5,000,000 » at the Çavuşağzı sector
51,000,000 tons

However, these figures should be checked by 3 or 4 more drill-holes to be sunk in this area.

1/5,000 scale map in the eastern sector of the coal area of Pelitovası and the Tarlaağzı Amasra region, located east of Filyos, as well as the revisional surveys on a 1/100,000 scale of the western part of Pelitovası have been completed.

Again, with a view of checking the existence both cross-wise and deep-wise of the probable underground synclinal zone, south of Kandilli in the Zonguldak area, 378 pits have been sunk in an area 30x10 km^2 and seismic profiles, obtained by test blasting, were made in order to ascertain whether this structure continued towards the east. The data obtained are presently under interpretation. In accordance with the working program, a road, 35 km long, enabling transportation of our drilling equipment and vehicles, both small and large in size, was built from Cide to Pelitovası and although the F. 500 drilling truck, ordered from the United States for this prospection, has not yet arrived, exploratory drilling started with the existing equipment. The first drilling was stopped at a depth of 374 meters and the second has been started. Along the 338.40 m of the first drill-hole, 14 seams bearing traces of coal have been intersected. The thickness of these seams varies from 0.30 to 2.50 meters, and the coal appears as the remains of coal veins.

In the Azdavay, Karafasıl and Kırmacı - Maksut districts, which have been prospected from the point of view of coal geology and its economic value since 1953, a 1/5,000 scale geological map has been taken; at the same time seismic and geoelectrical surveys were conducted in this area. Based on field geology and seismic tests, exploratory drilling started and drifts made by EKİ were checked. In 1955 these surveys and prospections went on; in this year alone, 16 drill - holes were sunk totalling a depth of 4039.59 meters; thus 23 drill-holes making 7394.23 meters

altogether were carried out in this district.

As a consequence of all these activities, it was concluded that the underground strata in the Azdavay district are broken and overlap each other, or, as the geological term goes, they show a scaled structure. Under such geological conditions, the coal seams have lost their original homogeneity, due to strong movements, and have been scattered in the form of blocks and fragments; the coal deposits are overturned, the old deposits intermixed with or overlapped by the recent ones, and are broken, stretched put, squeezed, and hence, the real coal seams do not practically exist. The deposits, which should bear coal, have left their original base and have slided from the south to the north. Consequently, the coal content of the deposits remained to be as irregular coal lenses, as coal blocks or as smaller coal remains. Certain deep-drilling operations were carried out to check whether there existed calmer and more favourable coal zones beneath the layers which were nearer to the surface and thus disturbed. These drilling operations confirmed that the above conditions could also prevail in the deeper sections, that the coal fragments and accumulations were not local, that they were intercalated in the younger and plastic formations under pressure, that they did not have their bases there, and that consequently the coal outcrops observed on the surface were limited and accidental. The coal reserves of this area, which can only be roughly estimated and can in no way be fully evaluated, would involve—from the mining techniques viewpoint—too great expenses to justify an economic exploitation. Moreover, although the calorific value of the existing coal is rather high, its uses are limited, because this coal is of poor quality, being fractured and crushed (mylonitized).

It is doubtful whether the insignificant coal reserves of the Azdavay - Karafasıl - Kırmacı region, which have been determined on the basis of geological maps, cross-sections, petrographic studies, drilling reports, core analyses and seam sections, seismic and geoelectric surveys and logging diagrams, can be profitably mined even by small private enterprises. As the conviction has been gained that the exploitation should be limited to lenses and vein remains of coal, which allow open pit mining or can at least be mined above galleries driven from outcrops at creek level, the exploration work in this district has been discontinued.

Lignite Geology and Prospections :

1. The Lignite Geology Services, charged with the task of carrying out systematic and detailed geological prospections of the lignite deposits and outcrops, which are known to exist in Turkey, and of determining their reserves and quality, have concentrated their studies on the lignite occurrences within the provincial and township boundaries of Ankara, Gaziantep, Aydın, Bolu, Çanakkale, Çorum, Çoruh, Edirne, İçel, İzmir, Isparta, Erzurum, Kars, Kütahya, Kayseri, Manisa, Yenişehir, Niğde, Sivas, Tekirdağ and Van and the following detailed geological surveys have been made :

Pazarcık (Ankara)	804	km² geological exploratory survey, on a scale of 1/100,000.
Yusufeli (Çoruh)	260	
Posof (Çoruh)	200	

Söke	250	km² detailed geological survey, on a scale of 1/25,000.
Ödek Değirmeni (Bolu)	128	
Dodurga (Çorum)	137	
Kadıkebran (Edirne)	7	
Karaburçek (Edirne)	39	
Meriç-Serenköy (Edirne)	235	
Türkpiyale (Soma)	190	
Eyniş (Soma)	102	
Derviş (Soma)	220	
Saray (Tekirdağ)	100	
Yörük (Tekirdağ)	49	
Ahmetpaşa (Tekirdağ)	25	

Detailed geological surveys, on a scale of 1/10,000 and 1/2,000 of a total area of 83.75 km^2, at Kayıbucuk (Ankara); Şahnalı, Dalama, Hasköy, Kuloğulları (Aydın); Akçaşehir (Tire); Pazarören (Kayseri); Gemerek (Sivas); Dodurga (Çorum); Yusufeli (Çoruh); Yarıkkaya (Isparta); Seyitömer (Kütahya); Şahmanis (Van); Namrun (İçel), have been completed.

2. Drilling activities, which started at Seyitömer (one of the districts where geological surveys have been completed) at the end of 1954, continued during the year 1955 and further 11 drill-holes totalling 889.35 meters in depth and four shafts totalling 60.45 meters in depth were opened. Thus the survey and prospecting of 331 hectares, out of the total 870 hectares of the Lignite Basin at Seyitömer, were carried out. As a result, 50 million tons of visible reserves have been estimated and the reports, concerning that part of the region where the prospecting work has been completed, were turned over to Etibank.

3. The probable known reserves of the Dodurga lignite deposits, exploited by the İdarei Hususiye (an official governmental department) of Çorum, were considered to be 750,000 tons. Upon prospections and 17 drill-holes totalling 5881 meters in depth, conducted this year by the Institute, it has been observed that this coal basin is larger than previously estimated. Work is to be continued there next year. According to the data so far available, some 9,000,000 tons of visible, 7,000,000 tons of probable and 15,000,000 tons of possible reserves have been estimated.

4. Based on the detailed geological surveys and on 19 drill-holes totalling some 1251 meters in depth, executed this year at the Şahmanis Lignite Deposits, located to the SSE of Van, some 2,000,000 tons of visible reserves have been estimated.

5. Geological prospections conducted within the Saray Kazası (Tekirdağ) area and 14 exploratory drill-holes, 1600 m in total depth, have crossed coal seams attaining a thickness of 2 - 2.5 meters, whereby this district has acquired some importance. Drilling is actually going on in this area.

6. Three exploratory drill-holes have been conducted at a total depth of 504 meters in the neighbourhood of Koçhisar, one of which has crossed two lignite seams at a thickness of 1 and 2 meters respectively. This small coal basin, which seems favourable for a local exploitation, is estimated to have reserves of lignite of some 1,500,000 tons.

7. 1/10,000 • scale detailed geological surveys have been executed in the

lignite basin at the Kayıburçak, located some 40 km west of Ankara.

The lignite is of poor quality, but the very quiet structure of the basin makes mining easy. Moreover, as the coal strata are overlain by hard limestones, the underground exploitation can be made at a minimum cost. The probable and possible reserves of this basin have been estimated at 2,390,000 tons and 3,500,000 tons respectively. It is necessary to put down some 30 drill-holes, ranging between 50 and 300 meters in depth and to study the extension of the basin towards the southwest for its geological structure.

8. Prospection carried out in the lignite deposits of Balkaya, Erzurum, has proven that there exist 2 exploitable seams, whereas only one seam had been previously estimated. The lower seam is actually mined by means of a gallery, the upper seam is only known by its outcrops. Two drill - holes to a total depth of 938.63 meters have been made to check the extension of these seams towards the east; however the results obtained were negative. Consequently, it is believed that there can exist only a reserve of some 2.5 million tons of coal in this area.

9. Six drill-holes totalling 963.73 meters in depth, have been executed in the Namrun lignite deposits, located 35 km north of Tarsus, in the province of İçel and visible reserves of 250,000 tons have been estimated until present time. However, it is hoped that this figure will go up to 400,000 - 500,000 tons. Although these reserves are very modest, particular stress has been lain on these lignites, as they are the most favourable deposits in the Adana district, which is undergoing big industrial development.

10. Based on the geological prospections conducted at a scale of l/25,000 in 8 parts of the lignite basin of Söke-Kuşadası, which proved to be promising in previous prospections, we are convinced that only two of these parts bear some economic importance.

Reserves up to 2,000,000 tons could be estimated for these two sectors, where the quality of coal is good. The preliminary report on this basin recommends an extension for a further 160 meters of the gallery which is presently opened by means of 8 drill - holes to a depth of 200 - 500 meters.

11. The detailed geological prospections executed in the lignite basin of Nazilli-Hasköy, at a scale of 1/10,000, have shown that the lignite layers which represent a very complex structure are highly folded and broken. The complexity of these layers renders an estimation of the reserves impossible. However, a general idea can be had on the quantity of the existing coal by means of a closer drilling network. The existing coal is good in quality and production can be maple by open-pit mining. It is recommended to sink 5 exploratory drill-holes down to a depth of 100-300 meters each.

12. 1/10,000 scale topographical maps and the detailed geological map of the lignite occurrences of Şahnalı, Dalama and Kuloğulları, situated 15-20 km south of Aydın, have been made this year and the Şahnalı and Kuloğulları seams were estimated to have a total of 1,770,000 tons of possible reserves. It is necessary to sink a few drill-holes in these occurrences, which are actually exploited and which are supplying fuel for local needs, to have a clearer picture of the stratification conditions, so that the yield of these seams may be increased.

13. 1/25,000 scale detailed geological surveys were conducted this year on the lignite occurrences in the pro-

vince of Bolu. According to these surveys, there exists lignite in two basins in this area, which are favourable for exploitation. These basins are: Bolu - Mengen (Merkeşler) and Salıpazarı. The Merkeşler basin is estimated to have possible reserves of 24 million tons and it remains to be checked whether the basin extends towards Çerkeş and Kastamonu in the east. The reserves of the Ödek Değirmeni, which constitute only a minor part of the Salıpazarı basin, have been estimated to be up to 1,500,000 tons. Studies on the other parts of this basin are not yet sufficiently advanced for an estimation of the reserves. The quality of the coal in this basin is very good and the coal has a calorific value of 4,500 Cals. In the Kuyupınar - Himmetoğlu-Bölücekova basin, the coal is of poorer quality having only 2,500-3,000 Cals. of calorific value. Reserves, here, are estimated to be up to 2,000,000 tons.

In order to evaluate the reserves, it is advisable that 14 drill-holes, 50-500 m deep, with a total depth of 3,210 meters and 12 drill-holes, 10 — 150 m deep, be sunk in the Merkeşler and Salıpazarı basins and in the Kuyupınar-Himmetoglu - Bölücekova basin respectively. In the Kükürt basin, west of this area, there exists a lignite deposit, bearing coal of the same quality.

14. 1/5,000 scale detailed surveys have been executed in the lignite basin of Yarıkkaya, Isparta, and the lignite seam could be followed by 8 trenches up to a distance of 3.5 km. The thickness of the seam varies between 60 cm and 1 meter (even 1.90 m) and the average thickness can be considered as 70 - 90 cm. The coal is of higher quality towards the west and the reserves may possibly be a few million tons.

4 or 5 drill-holes must be sunk along the southern extension of the occurrence and in case the results are positive, the reserves should be checked by one or two drill-holes further to the south.

Around the coal there is a layer of clay which is very plastic. Hence, it can be said that certain difficulties might arise during exploitation.

15. 1/25,000 scale geological maps were completed and detailed prospection carried out in the lignites situated in the neighbourhood of Deniş-Evciler and Türkpiyale, north of Soma, and in the lignites situated on the southern border 15 km SW of Soma, hear Eyniş in the province of Manisa. Based on these geological maps and surveys, the following reserves can possibly exist at :

Türkpiyale	6	million	tons
Deniş	1	»	»
Evciler	2	»	»
Eyniş	3	»	»
Total	12	»	»

Mining Geology and Prospections :

The mining prospections, so far undertaken by the Mineral Research and Exploration Institute, have been conducted in various parts of Turkey with the aim of exploring new mineral deposits; all milling reports have been given due consideration and preliminary reconnaissance prospections made at places so advised. Accordingly, there are 5,668 reports in the archives of the Institute.

It is next to impossible for the Institute, with its present setup and staff, to work on the systematic geological mapping, on one hand, and, on the other hand, execute prospecting and detailed explorations of minerals and mines, whose preliminary surveys have already been conducted. Nowhere in the world, institutions, similar to our Institute, have ever performed

successfully all these activities at the same time. Consequently it has been recommended that the Institute should take in hand certain regions in Turkey which appear to bear some mining significance, to carry out systematic regional surveys and to find and evaluate all kinds of valuable minerals and ore deposits in these regions.

For the planning of this working program, the Institute has, through the Technical Assistance Administration of the United Nations, invited to Ankara two experts and also Professor Borcher of Clausthaul Mining Academy in Germany. Following discussions with these specialists, systematic regional surveys have been started at the Gümüşhane - Giresun province of the Northern Anatolia, where many mineral occurrences are known to exist, and at the Biga peninsula, west of the Balıkesir meridian. These somewhat long-termed surveys require a close collaboration of all the departments and services of the Institute; accordingly, the activities of our experts in geology, geophysics, mineralogy, petrography, chemistry and drilling have been coordinated and the working program established.

The preliminary data obtained from surveys which started this year in the metallogenic province, west of the Balıkesir meridian, are as follows:

1. Northeast of Yenice, in the Çanakkale province, an important tungsten mineralization has been observed in several localities, in the scarn outcrops, on the northern sector of the Çakıroba granitic massif. It has been decided to , investigate this scarn zone by a number of trenches and to map it on the scale of 1/1,000. Besides, a geological survey on the 1/25,000 scale will be made along the granite contact.

2. The iron ore deposits actually exploited northeast of Ayvacık in the vicinity of Bakırlık Dağ, province of Balıkesir, form a number of copper and pyrite-bearig lenses. The microscopic study of the samples collected in this place, which has already been previously studied, necessitated reconsideration of these deposits.

3. Tungsten and molybdenum ore deposits have been observed in two places, at the contact of the granitic massif in the N - S direction. This massif is located at Kıranlı, north of Kozak Dağı, along the border of the provinces of Balıkesir and İzmir. It has been decided to draw a 1/25,000 scale geological map of this contact zone and to follow the mineralization zone by means of trenches.

4. In the vicinity of Eğmir, east of the Havran village, province of Balıkesir, exist some important iron deposits which have been formed by post-volcanic thermal activity. However utilization of these ores is complicated by a high arsenic content. A study is being conducted in order to establish the origin and the distribution of the arsenic content. The Pirenli iron ores have been formed in the same way, but are free of arsenic. It has been decided to verify whether this deposit extends to the west by executing some drill-holes. At Kazdağ, 7 km north of Altın Oluk, in the same province, sedimentary iron ore deposits exist between metamorphic beds. A preliminary survey has shown that this deposit consisted of magnetite and hematite and that it existed in several horizons. In some places the ore attains a thickness of 2.5 m and although its iron content is only 25 %, it can easily be increased by the magnetic separation process up to 50 %, as proven by Laboratory tests. It is understood that this ore will

be of value in industrial application. This type of iron ore, discovered for the first time in Turkey, will be checked this year by means of magnetometric methods and if necessary drilling will be conducted for the evaluation of the reserves.

The degree of importance of the lead and zinc occurrences, related to the volcanic eruptions in the neighbourhood of Altın Oluk north of the gulf of Edremit, will be known after the 1/25,000 scale geological surveys are completed in this district.

5. The following data have been obtained from the surveys started this year in the Giresun-Gümüşhane metallogenic province:

As is well known, a long time ago, first the Genoese and later other foreigners have conducted explorations and partial exploitations in this province. As the pits and galleries remaining from these ancient workings are actually in ruins and closed down, it is extremely difficult to conduct geological research in this region. Our activities in this ancient mining area scattered in the Tirebolu - Harşit - Kürtün and Torul, and along the Harşit valley, are for the time being limited to geophysical exploration. Later on we shall proceed with small-scale mining operations such as cleaning and opening of the old drifts and inclines, and when necessary, execute drilling. It is decided to conduct mining operations during 1956 at places where the geophysical prospecting, such as P. S. (Spontaneous Polarisation), has shown the highest reaction and to go on with geophysical operations in the. deposits mined in the old times.

This kind of exploration will serve, on one hand, for a general orientation and, on the other hand, the preliminary results obtained will be of use for the comparison with other deposits of similar mineralization, which are present in this region.

Two groups of ore have been given priority in the explorations covered under the program of the Giresun - Gümüşhane area.

It must be noted that this program has been established in such a way as to make possible any alterations in case the results of the preliminary research should indicate them. This year, four cupriferous pyrite deposits, located near the seashore in the Tirebolu district, province ofGiresun, have been started from the first group. These deposits are at an advanced stage of prospection and their geophysical - electrical (P. S.) surveys have been already executed.

These deposits are as follows :

1. The Cupriferous Pyrite Mine of Israel. - The galleries opened as based on the data of the geophysical prospections conducted at the cupriferous pyrite mine of Israel, crossed a cupriferous pyrite zone 20 meters thick. To check the extension of this mine, it has been advised to sink four drill-holes at determined locations.

2. The Copper, Lead and Zinc Mines of Harköy. - The report on the geophysical surveys carried out in this area has not. been handed in yet; however, although nothing definite can be said now, it seems, according to preliminary results, that the positive reactions failed to be observed with P.S. in this old exploitation area, which has galleries and ventilation shafts. This failure is due either to the exhaustion of the ore by old workings or to the presence of the ore at a depth below the underground water level. The latter motive seems to be stronger; hence exploratory drillling is recommended.

3. The Copper, Lead and Zinc Mine of Eseli.- Geophysical Spontaneous Polarisation

surveys have been conducted also in this area and according to the results of these surveys- work to be executed next year will be decided.

4. The Cupriferous Pyrite Mine of Lahanos. - Here Spontaneous Polarisation has shown strong reactions. Therefore, it was recommended to carry out a few drilling operations both within and without the old mining exploitation area.

Almost all the mineral deposits of the second group exist within the limits of the Torol disrict, in the province of Gümüşhane. We mention here particularly the following mines, where only general prospection has been carried out:

1. Derindere (Copper, Lead, Zinc). - There are slag mounds in great quantities around these deposits, whose old workings have completely caved in. The ore content is fairly high. In the 200,000 m^2 milling area Spontaneous Polarisation * surveys are to take place.

2. Ulukıran (Copper).- There exist three galleries of old workings here. The mine shows an important mineralization. In case the geophysical surveys give favourable results, it will be necessary to conduct here mining exploratory and drilling operations.

3. Kusku Oğuz (Copper). The old galleries are wholly or partly closed down. It is planned to carry out geophysical prospections in this area.

4. Bakır Kıranı (Copper) - Here are also important slag mounds, remnants of the old workings.

5. Kavacık - Tanere.- Geophysical prospections are considered for cupriferous pyrite mines.

6. Kuru Maden (Copper, Lead, Zinc). - Old workings, such as galleries, inclines and pits, found in this mining area, are of great importance. It is probable, that these workings were carried out at several levels. It has been decided to execute here some geophysical surveys covering an area of 250,000 m^2 and, if the results are favourable, to reopen one of the lower galleries or sink drill - holes.

7. Dere Maden (Copper).— Remnants of many old workings have been observed here. But, in the first place, the galleries must be dewatered and Spontaneous Polarisation surveys must be carried out here. In the wastes of this mine, there exist 17,000 tons of ore with a chalcopyrite content of some 3 %.

8. Koruk and Kıran Mine (Copper). - Here also there are several closed down old galleries. Geophysical prospections will be made in an area covering - some 80,000 square meters.

Gold Prospections

For the prospection for gold and platinum deposits, which may probably be found in Turkey, a specialist has been invited from Switzerland this year.

1. The old gold workings located at Arap Dag, north of Izmir; 6 km east of Bayındır; in the arsenic-bearing veins, southwest of Tire; at the massif of Gözkayası, Evsekler and Suluca, south of Aydın and further south at the Karpuzlu massif, have been studied individually. The results of these studies are not yet available.

2. It has been known for a long time that gold exists in the Hatay district. The inhabitants of this district wash the sands with such common household utensils as 8-10 liter troughs and 40 - 60 cm paste-boards, and they sometimes produce gold in slight quantities. Since 1910, there has been some gold prospectors, among whom women abound,but nonetheless there has never

been a significant development in this line.

3. Such prospectors wash also the auriferous alluvions of the Kel Hamit Deresi, Kişecik Çay, Akıllı Çay, all affluents of the river Asi. The origin of these sands, which have been washed for gold since long time along these creeks, are the present - day river beds, terraces and the middle part of the conglomeratic deposits of the Miocene age. During 1955, researches were carried out along all the affluents of the river Asi, coming down from Kızıldağ and Musa Dag. The areas already prospected have been mapped on 1/5,000 and 1/10,000 scales.

4. 44 washing tests conducted in the Akıllı Çay revealed the presence of an average 0.33 gram of gold per cubic meter.

5. 20 washing tests carried out in the Kişecik Çay showed an average 0.05 gram of gold per cubic meter.

6. 7 washing tests performed in the Kel Hamit Deresi showed an average 0.16 gram of gold per cubic meter. Traces of gold have been rarely detected in the other creeks. The gold found is in the form of thin scales (paillettes), each of which is less than a milligram; scales of 50 -100 milligrams can seldom be found.

Such gold contents are far from being sufficient for an economic exploitation and even the local inhabitants do not consider this as a lucrative business. Because, in order that a man engaged in gold washing earns 4 liras a day, he must produce 0.6 gram of gold, which means that he has to wash 300, liters of sand containing at least 2 grams of gold per cubic meter. However, in 44 tests, this content has been only observed twice.

Furthermore, as the geological structure is not favourable for a higher gold content, prospecting work here has been terminated and the reports sent to the Archives.

7. During the preliminary prospections conducted in the vicinity of İnegöl, in the province of Bursa, traces of gold were observed in the alluvions of Mizal Deresi -joining the Tahtaköprü Deresi- on the granitic massif located 12 km upstream, and certain traces of mineralization have been detected. Hoping for the existence of primary deposits, prospections will be continued here next year.

8. There is an abandoned lead mine, situated at the contact of the granitic massif with the Cretaceous beds, between Of and Bayburt, some 30 km south of Rize, which was exploited by the Italians, before the World War I: it is formed of lenses in a quartzitic gangue. Analyses of the samples taken from this mine, during prospections in 1955, revealed the presence of 7 grams of gold and 1036 grams of silver- per ton.

Should the reserves prove to be favourable, the gold and silver contents being sufficient for exploitation, more detailed prospecting will be conducted in 1956, here and also further east in the granitic hills outcropping near Yusufeli and Artvin.

9. Bingöl Area: Researches have been conducted in the vicinity of Hamek Köy, between Genç and Palu, where discovery of a large gold deposit has been reported. Based on this report, corroborated by a large nugget sample, some 46 quartz outcrops, in the form of crushed lenses, were examined on the right and left banks of the Hamek Çayı, as far as the estuary of Hom Deresi and on the slopes of this valley. However, no traces of gold were found

here. Ali these outcrops were plotted on the 1/10 000 scale map. In addition, 36 washing tests were conducted in the alluvions of these creeks; 21 of the tests revealed traces of gold in the form of thin scales. The weight of these scales ranged between $^{1}/_{4}^{th}$ $^{1}/_{10}^{th}$ of a milligram. Apart from this, 0.17-1.20 grams of gold per cubic meter have been found, in three tests. The origin of the gold present in the alluvions could not yet be traced; consequently this area will be prospected for gold during the year 1956.

10. Darphane - Kazıkkaya, in the Kağızman district of the province of Kars, shows three kinds of bedding; namely, high terraces, low terraces and recent alluvions.

The high terraces have been exploited for a long time. Hence, there exist only about one million cubic meters of remaining sand, containing 0.1 gram of gold per m^{8}.

The area covered by the low terraces is small and these sands contain less than 0.1 gram per cubic meter.

The recent alluvions abound, particularly in the lower part of the Ortakale valley. However, their gold content is not important. Of the 39 washing tests carried out, three gave negative results; 18 yielded gold less than 0.1 gram per cubic meter; 15 yielded somewhat higher percentages. Only one test showed 1 gram of gold per cubic meter. The gold discovered is in fine fragments of $^{1}/_{2}$ milligram in size. 4 tests showed also some traces of platinum. In 1956, prospection for primary main placers will be started in the alluvions.

Tungsten Prospecting

The report prepared by the Institute on the surveys and prospections of the Uludağ Tungsten deposits, completed last year, was submitted this year to the Ministry of State Enterprises.

Survey on the scheelite (tungsten) mineralization, occurring at the contact of granites with marbles at the Çelebi Dağı, 25 km southwest of the Keskin district, Ankara, started this year, and the district has been mapped at a scale of 1/25,000. These surveys revealed the presence of tungten ores, with an average content of 0.98 %, in scarns at 16 different localities. During prospecting, two drill-holes, one 36.25 and the other 50.80 meters deep, have been executed; a well 8.40 meters in depth was drilled; prospections were conducted at 6 different places and a 3.10 — meter gallery was opened. The exploration work is not yet advanced enough to permit evaluation of the reserves. In the year 1956, exploration work parallel to the detailed geological survey will be continued here. An exploration license has been applied by the Institute this year for these deposits.

Many particles of tungsten ore, 2 particles of gold ore and a few particles of tin ore were found in the alluvions of the creeks crossing the Çelebi Dağı area. According to the calculations made, 100 grams of tin should be present in one cubic meter of alluvion. 500 grams per cubic meter of tin were found in the sands of one well sunk 5 km north of Keskin. This evidence necessitates prospection for tin in the alluvions of Kızılırmak and its confluents as well as in the neighbouring pegmatites. It is a known fact that the presence of 1 kilogram of Gassiterite (tin ore) per one cubic meter of alluvion renders these alluvions exploitable. Consequently, the granitic massif of Kırşehir has acquired importance not only because it shows a scheel-

itic (tungsten) mineralization, but also because of its tin content. Hence, more detailed prospection and surveys will be carried out during the year 1956 in this massif.

Likewise there is evidence of the presence of tungsten at the Akdağ mine in Yozgat, for which area the Institute has applied for an exploration license.

Iron Ore Prospecting

1. The final report summarizing the surveys and prospections conducted during the last year on the Ferizli and Akçukur sections of Çamdağ Iron Ore Mine, in Kocaeli, as well as the results of the ore dressing tests carried out by various companies in Germany, were submitted to the Ministry of State Enterprises on November 16 th, 1955. According to this report there are:

8,500,000 tons of iron ore with 25 % metal content at Ferizli and

1,400,000 tons of iron ore with 30 % metal content at Akçukur.

In this area open-cast mining shall be carried out.

The existence of iron ore exploitable by means of underground workings has been proven; however, prospecting should be done in the future to determine these reserves.

Surveys have been conducted at the Kayseri iron ore deposits which led to the following conclusions :

2. Camiağıl iron Ore Mine, where open-pit mining operations are being carried out, is located 30 km southeast of the Yeşilhisar railroad station, Geological and geophysical surveys have been conducted here and the possible reserves estimated at 450,000 tons. To check these estimates, it will be necessary to open a gallery some 100 meters to the south, starting from the southern side of the open mine. As for the determination of the extension and the quality of the ore body, a few drill-holes, 60-80 meters deep, should be executed.

3. Kovalı Iron Ore Mine. -In this mine, situated 20 km south of Yeşil Hisar, magnetometric measurements should be conducted in the first place and research made according to the results of these measurements. There is a sulphur-bearing ore beneath another iron ore deposit located in the vicinity. This primary ore must be investigated. The open - cast explotation can start immediately in the upper part.

4. Dereköy Iron Ore Mine (located 10 km southwest of Yahyalı).- In order to determine the primary-ore and its extension the ore bed must be entered from below horizontally by a 20 meter trench.

5. Kösedağ Iron Ore Mine (located between Bünyan and Pınar Hisar). - It has been recommended to execute four hand-operated drill-holes in search of the primary ore.

6. Faraşa Mine. - The geology of this mine should be mapped at a scale of 1/25,000. Furthermore, some trenches should be opened here and geoekctrical surveys carried out in determined localities.

Oil Geology

Based on the working program aiming at long-range prospection for new and virgin oil areas, as provided by the Petroleum Law of Turkey, exploratory surveys have been conducted in the Samsun - Sinop - Boyabat region; in the Ankara - Polatlı district, and in the northern part of Tuz Gölü in the Konya district. 40 oil de-

posits have been reported from various provinces and 15 of these localities were investigated. As a result of these studies, 4 natural gas seepages in Bursa; an asphalt occurrence at Tefenni-Burdur; an asphalt occurrence at Isparta-Uluborlu; a bituminous shale occurrence in Kocaeli-Gölcük were given - due consideration and it was recommended to conduct an exploratory survey at Uluborlu. From the viewpoint of oil, the Boyabat district seems to be the most important district, as on the northern boundary of this district (at Ekinveren), there is a paraffin-base oil-seepage. Furthermore, the existence of a structure favourable for the accumulation of oil has been observed in the southern section of this area. Consequently, a seismic survey of the district and consequent drilling of the structure, depenting on the results of the seismic prospection, were decided.

Based on the detailed geological surveys conducted this year, it is advisable to find out, the geological relations between the Kızılcahamam - Pazar - Şorba districts of the Ankara - Polatlı region, showing positive evidences of oil and the area of the Tuz Gölü, Konya, which is rather a large basin. It is probable that these districts will gain importance after the prospections as well as the seismic cross - sections, proposed to be executed next year, are completed.

The Cores of the Ağzıkara Well, of the Hocalı Wells Nos. 2,3 and 4 drilled previously in the vicinity of Adana, have been studied at the laboratories of subsurface geology. The detailed surveys on the stratigraphy of southeastern Turkey; microscopic examination of the samples collected in the Hazru area and the lithological, paleontological and physico-chemical studies of the Garzan Oil Well No. 12, have also been completed and their reports entered in the Archives of M. T. A.

Apart from these, the M.T.A. laboratories studied also the cores and samples of the Reşan Well No. 2 and Sazgın Well No. 1 for the account of the Türkiye Petrolleri Anonim Ortaklığı Turkish Petroleum Company).

HYDROGEOLOGICAL AND GEOTECHNICAL PROSPECTIONS

Underground Waters

1. Among hydrogeological surveys conducted with the purpose of meeting the water requirements of Ankara, 30 survey maps, scaled at 1/25,000, have been prepared for exploratory use, and it was recommended that geoelectrical surveys at places favourable for the accumulation of underground waters be conducted.

2. An artesian well yielding 70-80 liters of water per second has been drilled, based on hydrogeological surveys conducted for the account of Kütahya Azot Sanayii (The Kütahya Nitrogen Industries).

3. The municipality of Kütahya insisted that a well be drilled before a geological study of the area has been made; this well drilled to a depth of some 200 meters, gave negative results. Drilling of wells in the alluvions here and the improvement of springs and their collection basins has been recommended.

4. The hot springs of Adapazarı-Akyazı - Kuzuluk Köyü have been surveyed and recommendation was made to improve the collecting of waters.

5. The water of the hot springs of Bolvadin - Kızılkilise Köyü has been studied and advice was given to deepen the water collection basin to avoid any seasonal fluctuations in the quantities

of water and to prevent intermixing of this water with the alluvial ones.

6. With reference to the surveys made for the supply of water required by the Kartal Cement Plant, at the rate of 1,000 cubic meters per day, it was suggested to have the water supplied by 10-15 meters deep water wells.

7. As a result of a hydrogeological survey conducted on behalf of Messrs. Dumez at Karşıyaka, Izmir, suggestion has been made to have the water supplied by means of two wells, each 3 meters in diameter.

8. After a hydrogeological survey conducted in Afyon on behalf of Messrs. Dumez, it was recommended to have the water supplied by means of nearby canal.

9. Following hydrogeological surveys performed in Malatya - Batman - Diyarbakır for Messrs. Dumez, it was advised to use the water springs in the vicinity of Malatya and the alluvial waters near Batman and Diyarbakır.

10. After a hydrogeological survey carried out east of Yeni Mahalle (Ankara) for a military unit, suggestion has been made to have the water supplied by wells.

11. After a hydrogeological survey carried out at Çukurhisar, Eskişehir, on Messrs. Dumez's account, it was recommended to make use of the neighbouring alluvial waters.

12. In connection with the question of the water supply for the Çorum Sugar Refinery, it was recommended that the water be supplied from the alluvions of the Delice Irmak, drilling and pumping tests be made and the water analysed.

13. As a result of a hydrogeological survey conducted at Sincan Köyü, Ankara, on account of Messrs. Dumez, it was recommended to carry out exploratory drilling and pumping tests in the alluvions.

14. After a hydrogeological survey made for the Orman Çiftliği and the Cartridge Plant (Ankara), it was recommended to have three test wells made in the alluvions.

15. The hydrogeological surveys carried out at Acıkır, east of Sivrihisar, revealed that the subsurface layers of the area were gypsiferous. It was recommended to perform more detailed surveys to find the non-gypseous strata.

16. A general exploratory survey of the hot springs at Bergama, Dikili, has been conducted.

17. The hydrogeological surveys made south of Beypazarı show that here the alluvial waters may be used.

18. The hydrogeological surveys conducted in the vicinity of Şerefli Koçhisar brought to light that the area mighgt be turned into a fertile land by means of an underground dam; hence, drilling and geophysical prospecting were considered as superfluous.

Marbles and Gypsum

1. Researches made on the marbles of Konya - Ereğli - Ivriz led to the conclusion that large-size blocks of marble could be extracted in this area and that these deposits were favourable for a limited exploitation.

2. Researches and studies on the marbles of İncehisar - Afyon proved that these marbles are of very good quality, in large - size blocks and in ample quantities.

3. Through researches conducted on the gypsum deposits in. Ulukışla, it was observed that there existed in ample quantities workable gypsum of good quality.

4. Surveys conducted near Sivrihisar to find gypsum deposits satisfactory for the gypsum requirements of the nitrogen industry, i.e. about 1,000 tons per day, showed visible reserves of 1,000,000 tons and 6,000,000 tons of probable reserves. It was recommended to execute here 13 dirill - holes, at a maximum depth of 200 meters, and four 10- meter deep wells.

Construction - Foundations

The foundation base of the building to be constructed for Petrol Ofisi at Kızılay (Ankara) was determined and the place proven to be sound and favourable for construction.

The Glass Industries and Foundry Sands

1. No sand available for the glass industries and foundry has been found in the Ege region,

2. Sand reserves, estimated at some 8 to 10 million cubic meters, are found at Küçük Köy, İstanbul. Studies are underway to determine whether this sand is favourable for industrial use.

3. Surveys conducted on the sand banks of Avcıkoru - Şile, near İstanbul, revealed sand reserves of 200,000,000 m3. Studies on the quality of the sand are not yet completed.

4. The quartz at Çakılköy, Bandırma, has been studied and proven to be very good in quality; however, the quantity of the quartz is insignificant.

5. The sand banks at Kapakça in Thrace, whose reserves are some 400,000 cubic meters, have been found to be too fine-grained for the glass industries. Recommendation has been made to perform three borings to check whether there are coarser - grained sands in the lower parts of the banks.

6. The preliminary surveys, on the Podima glass sands have been conducted under the most unfavourable weather conditions; based on these surveys 4 exploratory drill-holes have been suggested. This drilling and further studies are presently underway.

Ceramic Raw Materials

1. A deposit of feldspar required for the ceramic industries has been prospected at Söğüt and Giresun. Further detailed surveys were recommended for estimating the reserves of these occurrences, which contain feldspar of good quality.

2. A clay - kaolin deposit varying in quality was studied at Osmaniye, Giresun; tests for utilization of these clays are presently carried out at our laboratories.

3. During 1955 a ceramic clay deposit was studied. This deposit is located at Kılıçlı, near Beykoz, Istanbul, and its reserves are estimated to be some 150-200 million tons. Preliminary tests conducted on these materials as regards forming and firing properties, showed a plastic porcelain raw material with a very low iron content. Laboratory tests on this raw meterial will be continued.

4. The feldspars, found in large quantities near Çine, Aydın and which are of good quality, will also be studied in detail.

Activity of the Chemical Laboratories

A total of 2,286 determinations were made in 1955 at the Analysis and Test Laboratories of the Institute, 1,191 executed for the Institute and 1,095 for outsiders.

The activities of the laboratories for the year 1955 can be summed up as follows :

At the Analysis Laboratory, 884 determinations were made both for the

Institute and the outsiders. Analysis work on the radioactive minerals was developed during 1955 and in spite of the lack of modern equipment good results have been obtained. On the other hand, spectral analysis was given due consideration and importance, and some progress has been noted in this field of activity. The qualitative determinations of the rare elements made possible by spectral analysis. The «flame photometer» bought for speedy and accurate determinations of potassium, sodium and calcium is successfully operated.

The Goal Laboratory, recently completed and fully equipped with up-to-date apparatus and material, has started its activity. Accurate and rapid determination of our coal is now possible, due to this modern equipment.

Previously the sulphur content of coal could be determined in 24 hours, whereas this determination takes only one hour now. Apparatuses for flotation and immersion tests have just arrived; hence washing tests for recovering lignites will soon start, and coal washed already is undergoing coking tests.

The most important work executed by the Flotation Laboratory has been the ore dressing of the Uludağ. scheelites, and a report has been prepared with preliminary estimates for equipping the laboratory with the requisite instruments and supplies. During this year the discovery of a new mineral, «Bursait», was reported. Furthermore, researches were conducted on the washing of the sands prospected for the glass industries to render them usable. Researches were also conducted on foundry sands.

The Ceramic Laboratory collected samples of raw materials, favourable for the ceramic industries and for fine ceramics in particular, from the Bilecik, Kütahya and İstanbul areas; sorted them out according to their value and proceeded to develop a body composition. This laboratory is working in close cooperation with the Department of Geology in order to determine the extent of these ceramic raw material deposits. Apart from these, the laboratory has executed 65 determinations, mainly in ore assaying.

In order to expand this laboratory, necessary equipment has been ordered, which will allow for more precise determinations.

Studies and tests are conducted at the Coal Laboratory, created recently at the Institute, for the most accurate evalution of Değirmisaz, Seyitömer and Tunçbilek lignites.

The tests conducted by Lurgi and Didier Company in Germany in an attempt to produce coke by mixing the Zonguldak coal schlamm with the Seyitömer lignite do not seem favourable, as the ash+water content of the schlamm in question together with the transportation charges do not render the production of such a coke commercially profitable.

It will be advisable to cokify the above-mentioned three coal varieties, if the coking tests made presently on the Değirmisaz lignites, at the Coal Laboratory, prove that the latter has sufficient adhesive property.

Should it be impossible to produce coke of good quality with the Değirmisaz lignites, it will, then, be necessary to add a little (5-10 %) asphalt or pitch. This pitch can be extracted from the tar by means of a small-scale distilling-unit, to be incorporated in the coke plant.

The coke gas produced by the coke plant can be used at power plants together with coal dust.

15,622	km²	General geological map scaled at 1/100,000
54,622	km²	Revision surveys at a scale of 1/100,000
64,578	hectares	Topographical work
8,373	km²	Detailed geological map for Economic Geology
122		Drill - holes
18,145	meters	» »
1,606	meters	Trenches, galleries, pits
1,095		Laboratory analyses (for outsiders)
1,191		Laboratory analyses (for the Institute)
1,979		Mineralogical-petrographical determinations
1,134		Micro and macro-paleontological determinations
2,608	point	a) Gravimetric } geophysical measurements
300	km²	b) Seismic } geophysical measurements
4,535	point	c) Electric } geophysical measurements
57		Reports on the prospections previously conducted (in the Archives).
123		Reports on the prospections conducted this year (in the Archives).
6		Secret survey reports made during this year.
6		Prospection reports handed in during this year.

Symposium of Applied Geology

The activities of the Mineral Research and Exploration Institute of Turkey received notes of appreciation from them. Upon the suggestion of the UNESCO, a Symposium of Applied Geology was held in Ankara in the year 1955. Apart from Turkey, delegates of Mediterranean countries such as France, Italy, Spain, Cyprus, Yugoslavia and of Middle East countries, such as Egypt, Sudan Transjordan, Syria, Lebanon, Iraq and Iran, have participated.

At the Symposium, communications were submitted and discussions made on the following subjects, viz.,:

1) Correlations of the Foraminifera of the Adana oil wells by the quantitative analysis method.
2) Old buildings in the earthquake belts in Turkey.
3) New observations on the Neogene of Southern Anatolia.
4) Lower Miocene formations of the Adana basin; their relation to other formations; oil possibilities.
5) A general outlook on the lignite deposits in Turkey.
6) Problems of applied hydrogeology in Turkey.
7) The stratigraphy, tectonics and oil possibilties of southeastern Turkey.
8) Hydrogeological prospections on the deserts, west of Egypt.
9) Hydrogeology of the volcanic region of southern Syria.
10) Maps used in the exploration of underground waters.
11) The role of asphalt in exploring crude oil.
12) Conductivity determinations, ancillary to hydrogeological prospections.
13) Geological prospecting in Lebanon.
14) The mineral wealth of Cyprus.
15) Underground waters in arid and semi-arid regions.

16) The geological map of Turkey.
17) The genesis and mineralization of tungsten deposits at Uludağ, Bursa.
18) Bursait, a new mineral, and its optical properties.
19) Topographical mapping in Turkey.
20) The official geological map of Spain.
21) Training ofyoung geologists in Spain.
22) The geology of the Sinai Peninsula and its relation to the oil strata.
23) Researches on the copper deposits of Egypt.
24) Inventory of the mineral deposits of the countries of the world.
25) Sulphur deposits of Egypt on the Red Sea shores.
26) The geology of the Kerkük oil strata.
27) The iron ore deposits of Egypt.
28) The mining laws of Egypt.
29) Training of young geologists in Yugoslavia and development ofmineral deposits.
30) The mining laws of Turkey.
31) Oil possibilities of Turkey.
32) The electrification scheme of Turkey.
33) Training of geologists in general.
34) Ceramic raw materials in western and northern Turkey.

The Museum

During 1955, the specimens of the minerals, rocks and fossils were classified and exhibited in the Museum of the Institute; a storing place for the cores and cuttings of the well samples was also organized.

ACTIVITIES OF THE MINERAL RESEARCH AND EXPLORATION INSTITUTE DURING THE FISCAL YEAR OF 1955

A — Prospections :

Prospection Area	Drilling		Remarks
Coal			
Azdavay, Kastamonu	16	4039 m.	Prospections completed.
Pelitovası, »	1	573 m.	» going on.
Lignite			
Seyitömer, Kütahya	11	889 m.	
Dodurga, Çorum	15	5007 m.	Reserves estimated at 15 million tons in an area partly private enterprises, but mostly owned by the Institute. Drilling is going on.
Şahmanis, Van	18	1059 m.	Owned by the Van Idarei Hususiye; reserves estimated to be about 2 million tons.
Namrun, İçel	8	1704 m.	Owned by private persons; results of surveys not known yet.
Koçhisar, Ankara	3	504 m.	Owned by private persons; final result could not be obtained.

Prospection Area	Drilling		Remarks
Balkaya, Erzurum	2	700 m.	Reserves up to 2.5 million tons.
Saray, Tekirdağ	11	1117 m.	This area seems to be important; prospecting is going on.
Tunsten			
Çelebi, Keskin	2	100 m.	
Salt			
Tuzluca, Kağızman	3	66 m.	
Limestone, Cement			
Kartal, İstanbul	15	298 m.	
Sand			
Podima, İstanbul	—	—	Drilling has been started.
Underground waters			
Konya	3	790 m.	
Kütahya	2	255 m.	

B — Geological Surveys and Prospections :

Survey Area	Map Scale	Hectares	Remarks
Lignite			
Merkeşler, Bolu	1/25,000	12,890	Private
Söke, Aydın	1/25,000	20,000	»
Şahinali, Aydın	1/10,000	625	»
Dalama, Aydın	1/10,000	117	»
Kuloğulları, Aydın	1/10,000	110	»
Hasköy, Aydın	1/10,000	2,000	»
Söma, Western Lignite Mines, Manisa	1/10,000	2,000	Etibank
Eymis, Manisa	1/25,000	10,200	Private
Denis, Emirler, Manisa	1/25,000	22,000	»
Türkpiyale, Manisa	1/25,000	19,000	»
Akçaşehirköy, İzmir	1/10,000	600	»
Gemerek, Sivas	1/10,000	4900	»
Pazarören, Kayseri	—	—	»
Arabınköyü, Nevşehir	—	—	»
Yarıkkaya, Isparta	1/5,000	700	»
Kayabuçuk, Ankara	1/1,000	1,900	»

Reconnaissance Area	Remarks
Oil	
1. Reconnaissance survey at Samsun - Sinop - Boyabat Camp set up at Samsun.	
2. Ankara (Polatlı - Haymana) detailed survey. Camp set up at Polatlı.	
3. Oil reconnaissance survey of the eastern and north-western part of the Tuz Gölü in the Konya province. Camp set up at Koçhisar, Aksaray.	
4. Surveys on the Reported Oil shows	
These have been studied *in situ* without setting up camps.	
a) Survey on Birecik, Sarıkköy	—
b) » on Susurluk, Yıldızköy	—
c) » Karadeniz Ereğlisi, Armutçuk Köy	—
d) » Kocaeli, Gölcük, Nüzhetiye Köy	Bituminous shale +
» » Bahçecik »	» » +
» » Siyretiye »	» » +
e) » » Çubuklubala Köy	» » —
f) Bursa Dereköy, gas	+
g) Kütahya Harmancık	—
h) Demirci, Akdere Köy	—
i) Isparta, Uluborlu	+ asphalt
j) Burdur	—
k) Denizli, Ahılı Köy, İncirlipınar, Hisar	—
l) Burdur, Tefenni Gölcük Köy	+ asphalt
m) Marmaris	—
n) Denizli, Sarayköy	—

Minerals :

Gold

1. Hatay, placer studies
2. Bingöl, Hamek studies
3. Kars, Kağızman - Zarphane, Kazıkkaya
4. Niğde - Bolkardağ
5. Bursa - İnegöl - Muzal
6. Rize
7. İzmir - Aydın

Copper and Pyrite

1. Giresun - Tirebolu - Eseli - İsrael - Harkköy
2. Gümüşhane - Torul - Harşit
3. Trabzon (prospections on reported deposits of copper and miscellaneous minerals)
4. Karabük - Karaağaç pyrite

Iron ore

1. Kayseri province, studies on various reported deposits
2. Zonguldak - Ereğli - Alaplı
3. Elâzığ - Palu - Avnik, apatite, magnetite deposits

Other Minerals

1. Lalapaşa - Vaysal lead
2. Survey of some chromite deposits in Mersin
3. Tungsten prospection at Akdağ Madeni, Yozgat
4. Studies on the asbestos occurrence at Boyabat, Sinop
5. Black amber at Oltu, Erzurum
6. Granite survey at Kozak, Edremit
7. Studies on the serpentine of Hatay
8. Tungsten at İnegöl, Bursa

C — Geophysical Prospections

1. Seismic Prospections of the Coal Basin at Karadeniz Ereğlisi.
2. Gravimetric and Magnetometric prospections

   Reconnaissance gravity surveys of Bor, Ereğli, Karapınar, Aksaray districts.
3. Resistivity

   Survey of the faults at Pelitovası.
4. Magnetometric surveys

   Iron ore survey at Anamur (private enterprise).
5. Spontaneous Polarisation

   Copper mine at Harkköy - Eseli (Tirebolu)
6. Well Logging

   Well logging of Azdavay, Dodurga and Pelitovası.

D — Field Work on the Geological Map of Turkey

I — 1/500,000 scale mapping :

Sectional map of Denizli:	The area covered is about 44,000 km^2; field work completed and the report handed in to the Service.
Sectional map of Diyarbakır :	The area covered is about 34,000 km^2; the field work is completed and the report handed in to the Service.
Sectional map of Van :	The area covered is about 42,000 km^2; the field work is terminated.
Sectional map of Konya :	The area covered is about 45,000 km^2; the field work is completed.
Sectional map of Sivas .	The area covered is 50,000 km^2; the field work has started.
Sectional map of Kayseri :	The area covered is 500,000 km^2; the field work has started.

II — 1/100,000 scale mapping:

a) Geological mapping : Survey of an area of 15,622 km^2 has been conducted, the district and sectional map numbers are shown below :

Ünye	27/1
Trabzon	29/2,3,4
Kocaeli	38/4
Eskişehir	55/1
Akdağ Madeni	60/1,2,3,4
Hınıs	65/1,2
Afyon	72/1
Kırşehir	75/4
Avanos	76/3
Gürün	78/1
İzmir	86/1,3
Manisa	87/2

Elbistan	95/2
Adıyaman	96/1
Maraş	112/2,4
Birecik	113/1.3
Kaş	140/1,2

b) Revision surveys: Revision survey of an area covering 54,622 km^2 has been conducted; the areas surveyed are shown as follows :

Bafra	9/3
Rize	13/3
Artvin	14/1,2,4
Çıldır	15/1,2,3,4
Samsun	26/2
İspir	30/1,3
Oltu	31/2
Kars	32/1,2
Kocaeli	38/4
Çankırı	41/3
Karaköse	49/3
Balıkesir	53/3,4
Beyce	54/3
Sivrihisar	56/2,4
Ankara	57/1,3
Akdağ Madeni	60/4
Sivas	61/1,2,3,4
Divrik	62/1,2,3,4
Dersim	63/1,2,3
Simav	71/1
Siverek	97/3

N. B. Geological mapping scaled at 1/100,000 has been completed (444 sectional maps)

The results of the mining research activities of the Institute during 1955 are as follows :

1. Kireçlik-Kirenlik-Alacaağzı
   51,000,000 tons of coal (possible reserves)
2. Seyitömer
   50,000,000 tons of lignite (visible reserves)
3. Dodurga
   9,000,000 tons of lignite (visible reserves)
   7,-000,000 tons of lignite (probable reserves)
   15,000,000 tons of lignite (possible reserves)
4. Tekirdağ (Saray)
   The field has acquired mining importance
5. Koçhisar
   1,500,000 tons of lignite (probable reserves)
6. Ankara (Karaburçak)
   2,370,000 tons of lignite (probable reserves)
   3,500,000 tons of lignite (possible reserves)
7. Balkaya
   2,500,000 tons of lignite (probable reserves)
8. Namrun
   250,000 tons of lignite (visible reserves)
   400,000 tons of lignite (probable reserves)
9. Söke-Kuşadası
   2,000,000 tons of lignite (probable reserves)
10. Kuloğulları, Şahnalı (Aydın)
    1,770,000 tons of lignite (possible reserves)
11. (Bolu) Merkeşler
    24,000,000 tons of lignite (possible reserves)
    (Bolu) Salıpazar
    1,500,000 tons of lignite (probable reserves)
    (Bolu) Himmetoğlu
    2,500,000 tons of lignite (probable reserves)
12. (Isparta) Yarıkkaya
    Some million tons of possible reserves

13. Soma

Türkpiyale 6,000,000 tons of lignite (possible reserves)

Deniş 1,000,000 tons of lignite (possible reserves)

Evciler 2,000,000 tons of lignite (possible reserves)

Eyniş 3,000,000 tons of lignite (possible reserves).

Mining Prospections

Uludağ (Bursa), 10,000,000 tons of visible tungsten reserves.

Çakıroba (Çanakkale) tungsten.

Çelebidağ (Keskin-Ankara) tungsten.

Kıranlı (Balıkesir) tungsten - molybdenum.

Akdağ Madeni (Yozgat) tungsten

Kazdağ (Balıkesir) sedimentary iron ore deposits.

Israel (Giresun) cupriferous pyrite; gave strong geophysical reaction.

Lahanos (Giresun) . cupriferous pyrite; gave strong geophysical reaction.

Derindere (Gümüşhane) cupriferous slag in important quantities.

Bakırkıran (Gümüşhane) cupriferous slag in important quantities.

Dere Maden (Gümüşane) cupriferous slag in important quantities.

Çamdağ (Kocaeli) iron ore.

Ferizli 8,500,000 tons Open pit
Akçukur 1,500,000 tons exploitation

Kayseri: Iron ore deposits
Dereköy, Kovalı, Camizağıl, Faraşa, Kösedağ.

Haliköy (Ödemiş) quicksilver, 80,000 tons of visible reserves.

Istanbul (Beykoz) ceramic clay, 150 - 200 million tons.