

DOCUMENTATION

ACTIVITIES OF THE MINERAL RESEARCH AND EXPLORATION INSTITUTE (M. T. A.) DURING 1957

In the course of the 20 years that elapsed from 1935 (year in which the Institute was set up) till the end of 1956, services rendered by the M. T. A. in the field of mining as well as in the discovery of new underground wealth, together with their effect on our economic life, were covered in a M. T. A. publication (M. T. A. 1935-56) issued in October 1957.

In the Institute's 1957 work program the following fields of activity carried most weight: (a) the completion of the Geologic Map of Turkey, (b) the finding and mapping of Turkey's lignite and bituminous coal deposits to meet the requirements of the rapidly growing modern industry, and (c) the search for all metallic ore deposits of high economic value and also radioactive minerals used in the production of atomic energy.

c. The detailed geologic map for mining investigations.

1 : 100,000 scale map :

Detailed geologic maps for the sections listed below — with a total coverage of 7,115 km² — are completed :

25 km ²	Vilâyet of Amasya	Merzifon district
345 »	» Edirne	Demirhanlı »
130 »	» İsparta	Yarıkkaya »
2,970 »	» Konya	Beyşehir »
320 »	» Malatya	Kuruçay »
375 »	» Samsun	Lâdik »
2,800 »	» Van	Seyvan »
150 »	» Van	Özalp »
7,115 km ²		

GEOLOGICAL ACTIVITIES

a. The revision of the 1: 100,000 scale geologic map.

The rather detailed 1: 100,000 scale Geologic Map of Turkey comprising 444 sectional maps, that was completed in the previous years, is now being revised. The revision of the sections between Elbistan and south of Malatya, Malatya and Keban, Çankırı and Çorum and those of Akdağ Madeni (Yozgat) and Aladağ (İçel) covered in 1957 some 51,570 km².

b. The revision of the 1: 500,000 scale geologic map.

The 1 : 500,000 scale geologic map, which has a particular merit in that it shows the general geology of our country, has been based on the 1 : 100,000 scale map. It includes 21 sections. Its revision was under way since 1955. In 1957, Kayseri and Hatay sections were completed together with the field work on the Rize section. Field work on Sivas, Adana and Kars sections still continues.

1 : 25,000 scale map :

Total coverage 2,253 km². Parts completed are given below :

275 km ²	Vilâyet of	Bilecik	Osmaneli region
4 »	»	Adiyaman	Kâhta »
120 »	»	Ankara	Nallıhan »
260 »	»	»	Beypazarı »
212 »	»	»	Kızılcahamam »
34 »	»	Bursa	Soğukpınar »
80 »	»	Balıkesir	Gömeniç »
25 »	»	»	Bengüler »
400 »	»	Çanakkale	Kurtlar (Hamdibey) region
110 »	»	Edirne	Harmanlı »
76 »	»	Erzincan	Deliktaş »
15 »	»	İzmir	İncecik »
597 »	»	Kütahya	Harmançık, Kızılıbük region
45 »	»	Malatya	Hatunsuyu region
<u>2,253</u> km ²			

1: 10,000 scale map:

A 1: 10,000 scale map of an area covering 26 km² in the Merkezler district (Vilayet of Bolu) was completed.

TOPOGRAPHIC MAPS

Mining prospectors as well as geologists must have topographic maps of specific scales to do their work. This necessity lead the way to the sending out, by the M.T.A., of teams of topographers which, in 1957, set 780 trigonometric points in the İzmir and Alaşehir districts; an area equivalent in size to 23 map - sections, i. e. 3,650 square kilometers (scale used: 1:25,000). In addition, 1:1,000 - 1:2,000 - scale topographic maps were prepared of Edremit, Ayvalık, Ayzmant and Eğmir in the district of Balıkesir; also of Tirebolu and Görele in the Giresun district and of Karakaya (Eskişehir), the work adding up to cover some 24 km², for use in development planning.

During this period concession maps, entered into the 1957 - 58 program, were also duly completed.

PETROLEUM GEOLOGY

Under the Turkish Petroleum Law all exploratory activities pertaining to

oil and the right for subsequent exploitation were turned over to the T. P. A. O. (Türkiye Petrolleri Anonim Ortaklığı-The Turkish Petroleum Company) as well as to any other firm (Turkish or foreign) with the required qualifications and an interest in the deal. Yet, M.T.A. has continued to prospect in the parts of the country, which had not been studied up to date, with a view to locating structures that appeared favorable to oil accumulation.

Work done by the M. T. A. in this line covered in 1957 an area of some 10 600 km², comprising (a) a section to the East of Van Lake (8,000 km²), (b) a section bordered by Sivas, Şarkışla, Kangal and Gemerek (320 km²), and (c) a section in the Çorum - Çankırı district (2,280 km²).

HYDROGEOLOGY

1. With the intent of finding a suitable water supply for the city of Ankara, a detailed study of underground water possibilities and water springs in the Etimesut and Gölbaşı regions was taken up and reports, with positive results, were submitted to the Ankara Municipality.

2. Hot springs of importance, in the vilayets of İzmir, Çanakkale, Sakarya, Kocaeli, Balıkesir and Manisa were examined and results reported.

3. At the request of the Ladik Municipality a hot spring was examined and results reported to this municipality. Likewise, hot springs in the vilayet of Eskişehir were duly studied and the results turned over to the Municipality of Eskişehir. Finally,

4. In order to find water for the Sümerbank factories, a search was launched in the regions of Manisa, Salihli and Bergama. The results were reported to Sümerbank.

MINERAL PROSPECTING

In the search for mineral deposits, those having economic, industrial and strategic values—such as tungsten, iron, lead, manganese, chrome and copper ores—were given first priority and detailed prospecting conducted in the areas considered promising. The discoveries made during this field work will, in the course of coming years, be subjected to further and more thorough investigation.

The districts or localities covered in 1957 are as follows:

Keban district (Elazığ):

A sector of some 2,000 km² containing 103 concession areas was combed in order to investigate occurrences of tungsten, vanadinite, iron and lead.

Akdağ, Yıldızeli district (Sivas):

Here detailed prospection and subsequent studies were carried out together with some exploratory mining to learn more about the tungsten, manganese, iron chrome, copper and barite occurrences.

District of the vilayet of Bursa:

The work undertaken by the Institute in 1955 led to the discovery in the

Uludağ region (Bursa), of a 10 million-ton tungsten deposit (valued at TL. 250,000,000, average content of 0.43 % per metric ton) that also showed the importance of the district in relation to tungsten.

In 1957 the Bursa district was subjected to a general prospecting and mineralization zones for tungsten, copper and zinc were determined.

District of the vilayet of Kütahya :

An area of 240 km² was combed for copper, zinc and chrome.

Kaman, Kırıkkale, Keskin districts (Ankara) :

An area of 600 km² was prospected for tungsten, iron and manganese with some exploratory mining done on localities considered interesting. In order to investigate a tungsten occurrence near Keskin, Çelebi Köy, an exploratory well was drilled to a depth of 136 m.

Tirebolu district (Giresun) :

With the purpose of determining the mineralization zones of pyrite and cupriferous pyrite which occur in this region, detailed geology and prospecting was conducted over an area of 1,200 km² that included localities such as İsrail, Harkköy, Lahanos, Eseli, Tepetarla, Kızılkaya, Killik, Keçeli, Kozköy, Harşit valley, Karabörk, Gırlak, Espiye, Akköy and Göçendere. Exploratory mining operations in İsrail, Lahanos, Harşit, Eseli and Harkköy; namely 1,968 m. of drilling (involving 24 wells), 943 m. of galleries, 48m. of shaft sinking, 542 m³ of trenches have given promising results as pyrite and cupriferous pyrite masses ranging from 6.5 m. to 24 m. in thicknesses were disclosed. These studies will be continued in 1958.

Antalya, Konya and Isparta districts :

An area of 3,500 km² was prospected to determine mineralization zones in

connection with boxite deposits. During this prospection, besides the occurrences within the district certain other ore deposits were shown to exist in the neighbouring regions as well.

Bilirköy district (Muş) :

An investigation is set forth to determine the size of the barite occurrences in this region.

Guleman district (Elazığ) :

An other investigation is under way to increase the present known reserves of the Guleman Mine (chrome) and to locate new deposits.

In addition to the work mentioned above, a number of individual prospecting activities have taken place in connection with gold in Çine, Kula and Eşme counties (İzmir); various minerals in some districts of the vilayets of Trabzon, Rize and Tunçeli; cupriferous pyrite in Sariyer (İstanbul); iron in Şarkı Karaağaç, (Isparta); gypsum, iron and quartz in Buldan (Denizli); lead and zinc in the vicinity of Ezine (Çanakkale); iron in the Yeşilhisar district (Kayseri); chrome in the districts of Kopdağ (Gümüşhane) and Aşkale (Erzurum); and tungsten in the district of Dudaş (Bilecik).

PROSPECTIONS UNDERTAKEN FOR
PRIVATE COMPANIES AND GOVERNMENT OFFICES

1. Promising results were obtained from geophysical studies coupled with drillings (506 m. in 16 wells) which were taken up on iron deposits in the Edremit and Ayvalık districts (Balıkesir) with a view to locating raw materials for the steel industry that Maden Arama ve Etüt Ltd. Co. is contemplating to set up.

2. The study in connection with the determination of the extent of the

Irmonite occurrence at Emet (Kütahya) was completed for the Azot Sanayii (Nitrogen Industries), a government concern.

3. For a private firm, a search for boron minerals was conducted at Emet (Kütahya) and Balıkesir district.

4. Detailed prospection was undertaken in Bursa, Eskişehir, Kütahya, Denizli, İçel and Çankırı regions to determine— for the Sümerbank— the size and quality of the magnesite deposits.

BITUMINOUS COAL

For good many years the determination of the size and extent of the coal measures in the Ereğli, Zonguldak and Amasra basins has been the object of a steady display of efforts. To serve this very end, that is for the exploration of coal seams, a number of bore-holes, adding up to 3,211 m., were drilled in these basins. It was reported that one bore-hole, northeast of Göbüköyü, went through 14 meters of coal, whereas on several other locations thicknesses ranged from 0.40 m. to 3.00 meters. This work will be carried on in 1958.

LIGNITE

As the lignite reserves throughout the country are gaining an ever-growing significance, in parallel with the economic progress, much pressure is put behind the drive toward the discovery of new and rich deposits, especially since 1954. Of course, those occurrences, which are either closer to the industrial centers or apparently richer than the others, were given first priority for consideration and in 1957 the following deposits were taken up for a detailed study.

Merkeşler (Bolu) :

Here exploratory work was started in 1957 and 17 drill-holes with a total

depth of 4,151 meters have been reported to cut through lignite beds, apparent thicknesses ranging from 0,75 m. to 2.40 m. The visible reserves were estimated to be about 12,000,000 tons. Calorific value: 4500.

Çan (Çanakale):

Drillings on 33 locations with a total depth of 9,399 m. have shown the existence of lignite here, with thicknesses ranging from 0.45 m. to 22 m. Visible reserves of 30,000,000 tons and probable reserves of 18,000,000 tons are reported for this region. Calorific value : 4534 - 5040.

Uzunköprü, Harmanlı (Edirne) :

14 holes were drilled in the lignite deposits in the vicinity of the Harmanlı, Kırköy ve Çavuşlu villages (3,841 m. of drilling in all), which cut through beds with apparent thicknesses ranging from 0.37 m. to 4.05 meters. Visible reserves here were 2,000,000 tons, while the probable reserves are estimated at 5,000,000 tons. Calorific value varied between 3595 and 5226.

Yarıkkaya (Isparta) :

Toward the close of the 1956 prospecting season, 3 holes, summing up to 873 meters, were drilled in the Yarıkkaya lignite basin and lignite beds with apparent thicknesses varying between 0.75 m. and 1.28 m. were located.

Subsequent studies pointed to the existence of about 900,000 tons of visible and 300,000 tons of probable reserves with calorific values from 3595 to 4124.

Beyşehir (Konya) :

In order to determine the quality and size of the lignite reserves, 6 exploratory wells were drilled here in 1957, adding up to 637 meters. They are reported to have cut through series of

lignite beds with apparent thicknesses ranging from 2.5 m. to 5.90 meters. The apparent reserves were estimated to aggregate some 116,000,000 tons with a calorific value that varied between 1350 and 2113.

STUDIES UNDERTAKEN FOR MUNICIPALITIES AND PRIVATE FIRMS

1. The geological study of the coal deposits in Hazro, in relation with the fuel requirement of the Diyarbakır electric power house.

2. Detailed geological study of the lignite occurrences of the Arabın village (Yozgat).

3. The geological, sporological, technological and petrographical studies of the Çukurova coal deposits.

4. Detailed geological study in the Kandilli - Kireçlik district (Zonguldak) relative to bituminous coal measures.

5. Geological studies of the Ladik, Kahta lignite beds.

All this work mentioned above was carried to completion and individual report handed over to the parties concerned.

SEARCHES LAUNCHED FOR RAW MATERIALS

Work done for Sümerbank :

A detailed study was completed to determine the size of the kaolin reserves at Arnavutköy, within the county of Eyüp (İstanbul), where 53 holes were drilled (398 m. in all) cutting beds 1 to 11.30 meters thick.

Development studies were carried out for the clay deposits of the villages Bağlıca, Boğazköy and Piriçköy; all within the county of Eyüp (İstanbul).

Necessary studies were carried through, in order to find out whether

the granodiorite and aplite occurrences at Küre (Bilecik) held sufficient reserves, adequate to feed a projected ceramics plant.

In the Thrace region detailed prospecting was conducted for the glass industry, on beds of sand favorable for glass manufacture and interesting localities earmarked.

Work done for the Çimento Sanayi T.A.O. :

The development studies of the kaolin, marble, clay and limestone, occurring within the Vilayet of Çanakkale, are completed in connection with Portland and white cement production.

The necessary studies were conducted at a location picked for a new cement plant and in the areas from which raw materials are to come.

Five exploratory holes (96 m. in all) were drilled down to determine the size of the rock salt deposits owned by the General Directorate of Monopolies in Çankırı. They cut a salt bed, 2 to 10 meters thick at spots.

Foundation Drillings :

For the Hayat Yapı Kooperatifi (a construction partnership) 5 foundation wells, adding up to 100 meters, were drilled at Çankaya (Ankara).

Prospecting for atomic energy raw materials :

As every one knows, the field of application for atomic energy is rapidly increasing and the search for radioactive minerals such as uranium and thorium used in the production of this precious energy has attracted a world-wide interest.

The matter having been given by the Institute the serious consideration it deserves, a new department — called

Atomic Energy Raw Materials Section— was added to the organization in 1956, which, since that time, has been strengthened with new recruits trained in special courses and now carries on the work.

Of the regions and localities where prospecting for radioactive minerals looked promising, the ones cited below were visited and prospected in 1957. On some of the occurrences certain amount of exploratory mining was carried out, in an endeavor to evaluate these discoveries.

Yıldızeli district (Sivas) :

Here a general prospecting was done toward the evaluation of the district and some areas of interest were selected for more detailed work in 1958.

Bolkardağ district (Niğde) :

Detailed radiometric study of an area, 24 km. long, was made with the help of 4,493 radiometric measurements taken and subsequent analyses of the samples picked in the field. The interpretation of the data still continues.

Menderes group - of - mountains district :

In the area to the North of Milas and Muğla, stretching up to the Menderes River, a general prospection was set forth and parts of interest worthy of closer investigation selected.

Istranca group - of - mountains district :

An area covering 1,500 km², in the mountainous parts of Thrace, namely Istranca group-of-mountains region, was prospected. The data compiled through 1,300 radiometric readings and 7 trenches made at favorable locations helped complete detailed isorad maps of the area. The work will be continued in 1958.

Edremit, Kazdağ (Balıkesir) and Çanakkale districts :

General prospection of the region was taken up with a detailed study of the granite bodies and their contact zones. Localities to be searched for radioactive minerals in 1958 are noted down.

Divriği district (Sivas) :

A batholith occupies a rather large area in this district. The sections of which judged susceptible to mineralization or in any way connected with the process, were studied for radioactivity coupled with the chemical analyses of samples taken from some 60 small trenches (roughly 350 cubic meters). In addition 2 holes, adding up to 293 m., were drilled and the radioactivity of the drill-cores measured to investigate the downward extent of veins bearing radioactive minerals. This investigation will continue in 1958.

Şebinkarahisar district (Giresun) :

The mass of granite to the North of Şebinkarahisar was prospected, while Gedehor alunites, lead mine at Asarcık and various lignite deposits were also checked for radioactivity.

Çoruh district :

The granite area between Çoruh and Rize called Kaçgar, together with alluviums of the Çoruh River and those sections of the district which contained copper, zinc and other metallic mines (some 600 km² in all) were subjected to a general prospecting. In doing this, 2,636 radiometric readings were recorded.

Keban district (Elazığ)

Work begun in 1956 was continued in 1957 and the general prospection of this district completed. The skarn sections along the syenite contact zones

were checked radiometrically and samples taken analysed. The remaining part will be worked on in 1958.

Kaman, Kırıkkale (Ankara), Avanos (Kayseri) and Kırşehir districts

The general radioactive prospection of the area containing these districts was taken up, during which radioactivity worthy of mention was detected in the spring waters and on the lignite occurrences.

Pınarbaşı district (Kayseri)

A general prospection covering the granite and andesite sections in the limestone formations that exist in the Kayseri, Bünyan, and Pınarbaşı districts was carried out and radioactive localities determined. The work will continue in 1958.

Sivrihisar district (Eskişehir) :

Following a detailed prospection for radioactivity of the location called Karakaya, west of Sivrihisar, an isorad map of the place was prepared. This work involved the drilling of 10 wells (total depth: 949m), the sinking of 3 shafts (adding up to 23 m.) plus a few trenches (208m³). In order to evaluate the locality the studies will be carried on in 1958.

In addition to the study of these districts and localities, whose geological structure was found suggestive of a possible radioactive minerals accumulation, every one of the lignite districts and basins subjected in 1937 to geologic and mining investigation was likewise given either a general or a detailed check-up for radioactivity.

In an attempt to cover as large areas as possible, profiting from every means at their disposal, the prospector teams made use of scintillometers mounted on jeeps and took readings along

the roads as they traveled. The readings were later plotted on a map. Localities where important anomalies were encountered, as a result of this along - the - roads type prospecting, were scheduled for detailed radiometric studies in the coming years.

The Şebinkarahisar (Giresun) district was discovered during such a prospecting trip.

All the minerals accumulated in the Institute's museum and laboratories in the course of 20 years field work and the drill - cores obtained during the various drilling jobs, together with the mineral samples which are kept in the museum and laboratories of Istanbul University's Faculty of Sciences and the Technical University were checked up for radioactivity and those with positive results, traced back to their localities of origin.

These localities will undergo as thorough an investigation in the coming years as the personnel and equipment on hand will permit.

Thus, briefly stated, during 1957, coupled with 14,022 radiometric measurements, general prospecting was carried out over an area totalling 14,994 km², while an area of 472 km² was prospected in detail where as many as 50,279 radiometric readings were recorded.

Geophysical studies :

Surface indications (seepage, outcrop, etc.) in relation with petroleum, coal and ore deposits are generally the starting point for subsequent geological and mining investigations; they are time-consuming and costly and do not always furnish a satisfactory answer as to the state of bedding, concentration and mineralization in a deposit. Therefore, prior to most development work a

pretty good idea may best be had of the extensions (especially depth) of a lode or of a deep-seated geologic structure (in case of petroleum and, to some extent, coal) by the application of one of the geophysical methods (seismic, magnetic, electrical, etc.) which are unquestionably faster and comparatively cheaper, yet dependable enough to help orient and guide future development work.

Geophysical activities in 1957 were concentrated mostly on those districts which were originally scheduled to be worked out by geological and mining methods. A list of them follows:

1 — *Prospecting for iron:*

Detailed gravimetry work was carried out with gravimetric measurements taken at 211 points on certain anomalies of limited extent, which were detected on the locality called Kovalı (Kayseri) during a magnometric study run over a larger area in 1956.

On the iron ore deposits at Ayazment and Şamlı (Balıkesir) 3,084 magnetic measurements were taken along profiles totalling 18,790 m., which pointed to the presence of rather rich iron deposits.

2 — *Prospecting for copper:*

The study undertaken in connection with the mineralization zones and reserves of pyrite and cupriferous pyrite occurrences in the vicinity of Tirebolu (Giresun) was carried on with geophysical methods (such as self-potential, resistivity and magnetic) and on several ore deposits and mineralization zones geophysical anomalies were detected. During this work a total of 6,284 self-potential, 602 magnetic, 847 resistivity measurements were recorded and on 30 locations electrical coring was applied.

The locations worked on are:

Lahanos Mine :

At this mine, a method called «mise a la masse» was used and the lateral boundaries of the deposit defined, that checked with the information obtained through subsequent drilling.

Karabörk, Gırlak and Kızılkaya :

Self-potential, resistivity and magnetic methods were used at Karabörk; self-potential and magnetic methods at Gırlak and only self-potential at Kızılkaya.

Tacce Tepe and Topçu Tepe :

Self-potential anomalies were noticed at these localities.

3 — Prospecting for coal :

Electrical well-logging was done on a total of 47 wells drilled in the lignite and bituminous coal districts with the following distribution : 5 in Amasra (Zonguldak), 8 in Merkeşler (Bolu), 23 in Çan (Çanakkale) and 11 in Harmanlı (Edirne). They helped determine with greater accuracy the ceiling of the coal seams which were drilled through and occasionally detection of schist layers within the coal seams was possible.

4 — Prospecting for petroleum :

Seismic reflection was used in a study of the Lüleburgaz region for the Natural Gas Ltd. Co. of Istanbul, with 368 shot-holes drilled (a total of 5,386 m.) and 426 seismic shootings that took place.

5 — Regional gravimetric and magnetometric studies :

In order to determine whether there existed a relation between the gravimetric and magnetometric results and the

geophysical units found in the metallogenic district in Balıkesir and Çanakkale vilayets, regional gravimetric and magnetometric surveys were made of localities covering a total of some 4,000 km² with a view to using the data obtained in the aerial geophysical studies of these regions which is contemplated to follow. In the course of this study readings were taken from 176 different points, of which 43 were used as bases.

To summarize, during the 1957 geophysical activities 211 gravimetric, 3,686 magnetic measurements were recorded, while in the surveys made using electrical methods 6,284 self-potential, 847 resistivity, 110 resistance readings were taken. On 30 locations electrical coring was done. In addition to those, electrical well-logging was carried out in 47 bore-holes (total depth, 11,622 m.) and in 368 shot-holes 426 seismic shootings have taken place.

In team-month units the distribution of work done is as follows :

<i>Method</i>	<i>Team-Months</i>
Seismic method	2.5
Gravity method	4.6
Magnetic method	11.2
Electric method	8.0
Electric well-logging	8.0

LABORATORY STUDIES

The chemistry, coal, ceramics, flotation, mineralogy and petrography labs handled in 1957 6,763 analyses 5,227 of which belonged to M. T. A. while the rest, 1,536 in all, were brought in by different offices, establishments, private firms and persons. A list of which is given below:

<i>L a b o r a t o r y</i>	<i>From M. T. A.</i>	<i>From Outside</i>	<i>Total</i>
Chemistry lab.	2,300	551	2,851
Coal lab.	391	225	616
Ceramics and dry analyses lab.	121	34	155
Flotation lab.	65	17	82
Zonguldak lab.	—	342	342
Mineralogy and petrography lab.	2,350	367	2,717
T o t a l	5,227	1,536	6,763

PROSPECTOR AND DRILLER TRAINING COURSES

Immediately after the search for radioactive minerals began in 1956, urgent need for more trained men to do the field work was recognized and the first course to train prospectors opened. The program included geology, mineralogy, petrography, mineral deposits, prospecting methods, handling and care of instruments, topography and some administrative training. Among the candidates, who were lyceum graduates, 11 received certificates as prospectors.

The second prospectors course still continues.

To be able to meet the demand for more drillers in the M. T. A. and other public offices, a training course was started three years ago which is repeated each year.

A 10-month program with a 4-month theoretical course followed by a 6-month practical training is applied; the latter part being spent in one of the drilling camps of the M.T.A. Those candidates who prove successful are then given the title of driller's helper.

In 1957 14 drillers were thus trained. 9 of them stayen with the Institute, while 2 went to work for the «İller Bankası» and 3 for the Turkish Air Forces.

The last course which began in 1958 still continues with 14 candidates.

4 men are being trained for the Sugar Co. and 2 men for the Turkish Airways. The remaining 7 will stay and work for the M.T.A.

TOPOGRAPHY COURSE

As the Institute's activities in the fields of geology and exploratory mining marked considerable expansion in the last years, the need for a variety of topographic maps and for topographers became more pronounced. To meet this situation, the first 6 month training course in topography was opened in October, 1957. Registered to take up this course were 8 candidates, two for Maden Dairesi, one for Etibank and five for the M.T.A. At least a lyceum diploma was required. The program included subjects, such as topography, trigonometry, error distribution, geology, measurements, care and handling of instruments, topographic drafting and law, 8 men were graduated from this course in April 1958.

PHOTOGEOLOGY COURSE

While the prospection of the widespread mineral deposits in Turkey is continued by the M.T.A., using the old fashion geologic and mining methods, prospecting from the air, as it is successfully applied in the United States (especially in the cases of metallic mines, such as iron, copper, lead, zinc, etc. and the radioactive mineral depo-

sits) is also attempted in this country. In order to train our geologists in the so-called photogeologic methods, which find application both in prospecting and in geology, a 100 - hour course is opened by the Institute's Photogeology

Service. It is given by Dr. H. SCHIEN from Holland, who is a photogeology expert working with the N. V. de Bataafsche Petroleum Maatschappij Co. in that capacity. The company is engaged in oil exploration in Turkey.

DRILLING CONDUCTED BY THE M. T. A. IN 1957

<i>Location</i>	<i>Type of deposit</i>	<i>Number</i>	<i>Meters</i>	<i>Remarks</i>
Amasra	Bituminous coal	6	3,205.58	
Bolu-Merkeşler	Lignite	17	4,538.22	
Yarıkkaya	»	3	711.50	
Çan	»	33	9,398.11	
Uzunköprü	»	14	3,859.25	
Beyşehir	»	6	636.60	
Tirebolu	Cupriferous pyrite	26	1,906.86	
Sarıyer	»	2	238.85	
Keskin-Çelebi	Tungsten	1	136.40	
Divriği	Radioactive minerals	2	293.25	
Karakaya	»	10	949.50	
Etimesut	Water	1	22.00	
Çankırı	Rock salt	5	83.64	
Edremit-Eğmir	Iron	16	552.40	
Arnavuiköy	Kaolin	53	572.95	
Ankara-Çankaya	--	5	100.00	for foundation work
T o t a l		200	27,205.41	

EXPLORATORY MINING WORK ON SOME MINERAL DEPOSITS GARRIED OUT BY THE M.T.A. IN 1957

<i>Type of work</i>	<i>Location</i>	<i>Object</i>	<i>Meters</i>	<i>Sub-totals</i>
Galleries	Espiye (Giresun)	Copper	936.85	
»	Bolkardağ	Radioactive minerals	205.50	1,142.35 m.
		Radioactive minerals	26.80	
Shafts	Karakaya	minerals	5.15	
»	M. T. A.	Water	31.95	63.90 m.
»	Israil	Copper		
		Radioactive minerals	114,320 m ³	
Trenches	Karakaya	minerals		
»	Giresun	Copper	480,400 m ³	
»	Divriği	Radioactive minerals	350,000 m ³	944,720 m ³