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REPORT

on

the

SEISMOLOGICAL ACTIVITIES

IN

IRAN

During the Year 1966

Presented by the

INSTITUTE OF GEOPHYSICS

TEHRAN UNIVERSITY

November 1967

(Tehran University Press)

Contents

The Seismological Activities

in

Iran

During The Year 1966

1—Introduction

The Seismological Branch of the Institute of Geophysics, Tehran University comprises six stations in the following provincial cities:

Tehran

Mashad

Shiraz

Tabriz

Kermanshah

Menjil

These stations came into full operation early in the year 1966, complete from the point of view of equipment and personnel.

In addition to the routine duties of the stations, some of these, to a certain extent, are carrying out research activities while the station in Tehran has a greater responsibility from the point of view of planning, technical advice, administration and research programs.

The research activities are growing daily as the personnel gains more knowledge and experience in the manifold seismological problems.

All the seismic data from the provincial stations are collected in the Central Station in Tehran, whereby all the processing, calculations and interpretaticns are carried out and the corresponding bulletins compiled, published and distributed.

A world wide exchange of these monthly bulletins are made, not only

with all the existing seismological stations, but are also forwarded to all interested in seismic and earthquake engineering problems.

II-The Constitutional Organization

Dr. M. Sobouti	Director of Seismological Service and Research
Dr. B. Mohammadioun	Director of Tehran Station and Research Coordinator.

Senior Staff

Mr. Kh. Moftakhar	Research Assistant
Mr. A. Hedayati	» »
Mr. Dj. Taheri	» »
Mr. P. Arzideh	» »

Junior Saff

Mr. M.T. Tarkeshi	Operator in Tehran Station
Mr. N. Mozafari	» » »

Provincial stations

Mr. M. Seid Nabavi	Director of Tabriz Station & Research Assistant
Mr. A. Anzabi	Assistant Director of Tabriz Station
Mr. M.A. Enayatollah	Director of Mashad Station and Research Assistant
Mr. E. Assoodeh	Assistant Director in Mashad Station
Mr. R. Soltanian	Director of Shiraz Station
Mr. S. Soltanian	Assistant Director in Shiraz Station
Mr. A.A. Eslami	Director of Kermanshah Station
Mr. M. Payman	Director of Menjil Station

III—Description of The Stations

A—Tehran Station

1—Location and Site of Tehran Seismological Station

The seismological station in Tehran is one of the constituent observatories of the Institute of Geophysics, Tehran University with the following specifications.

a- Geographical Coordinates

latitude 35° 44′ 16.3″

longitude 51° 23′ 09″

b- Geocentric Coordinates

Geocentric latitude, longitude, geocentric direction consines a, b, c and the height are given below:

Geocentric Direction Latitude	35° 33′ 12″ North
» » Longitude	51° 23′ 09″ East
Geocentric Direction Cosine a:	+0.50773
Geocentric Direction Cosine b:	+0.63570
Geocentric Direction Cosine c:	+0.58146
Height:	1360 m.

c- Site

The Institute is situated on the outskirts of Tehran at a distance of some six kilometres from the Tehran University. To the west, the Institute is bordered by a river bed of about 250 meters in width and 10 meters in depth with seasonal water flow from the mountains in the north. The compound covers an isolated area of about 10 acres of land in peaceful hilly formations, undisturbed by traffic and other artificial noise sources. The Institute also enjoys the remoteness from the Caspian Sea at a distance of about 150 km. so that the microseisms do not cause any disturbance of the recordings of the natural earthquakes.

d- Geological Formations.

Geologically Amirabad where the Institute is located is a region at the foot of Elborz Mountains slightly inclined to the south with hilly anticlinal alluvium formations having the general northwest and southeast direction.

e- Instrumental Foundations.

The Seismograph vault in the basement of the building is four metres below the ground level, and the foundation of the instruments is still sunk two meters deeper on solid compact sandy formations.

The foundations of the station are based on sub-recent compact alluvium.

2—**Instruments**

a- Short Period Seismographs

1- Stuttgart-Hiller Seismograph with Transistor Amplifier

Components	N-S, E-W and Z
Mass of Pendulums:	700 gm. in all components
Effective Natural Period of Pendulums:	1.1 sec in all components
Type of Damper:	Electromagnetic
Damping Ratio of Pendulum:	$^{10}/_{1}$ in all components
Natural Period of Pen Galvanometer:	0.25 sec in all components
Transducer:	Changing Flux Displacements Type
Static Magnification:	10,000 in all components
Registration:	Smoked Paper
Paper Speed:	60 mm per minute
Determination of Instrumental Constants:	April 30th, 1965

b- Long Period Galitzin Electromagnetic Seismograph

Components:	N-S, E-W and Z
Mass of Pendulum	3.5 Kg in N-S and E-S; 3.0 kg in Z
Natural Period of Pendulum:	11.0 sec in N-S and E-W; 10.8 sec in Z
Type of Damper:	Electromagnetic
Damping Constant:	Critical in all components
Natural Period of Galvanometer:	12.3 sec in N-S and E-W; 11.1 sec in Z
Damping Constant of Galvanometer:	Critical in all components
Magnificationn Factor (AK/π1):	492 in N-S 600 in E-W 340 in Z
Registration:	Photographic Paper
Paper Speed:	30 mm per minute
Determination of Instrumetal Constants:	June 15th, 1965

The overall magnification curves of seismographs are shown in Tab. I.

c- Time-Keeping System

1—**Master Clock**

For tke master clock of the station a precision seconds-pendnlum clock of Clemens Riefler is employed. The clock is equipped with air-pressure and temperature compensators and can be operated with a higher accuracy than 0.1 second per day which is recognized as the change of daily rate.

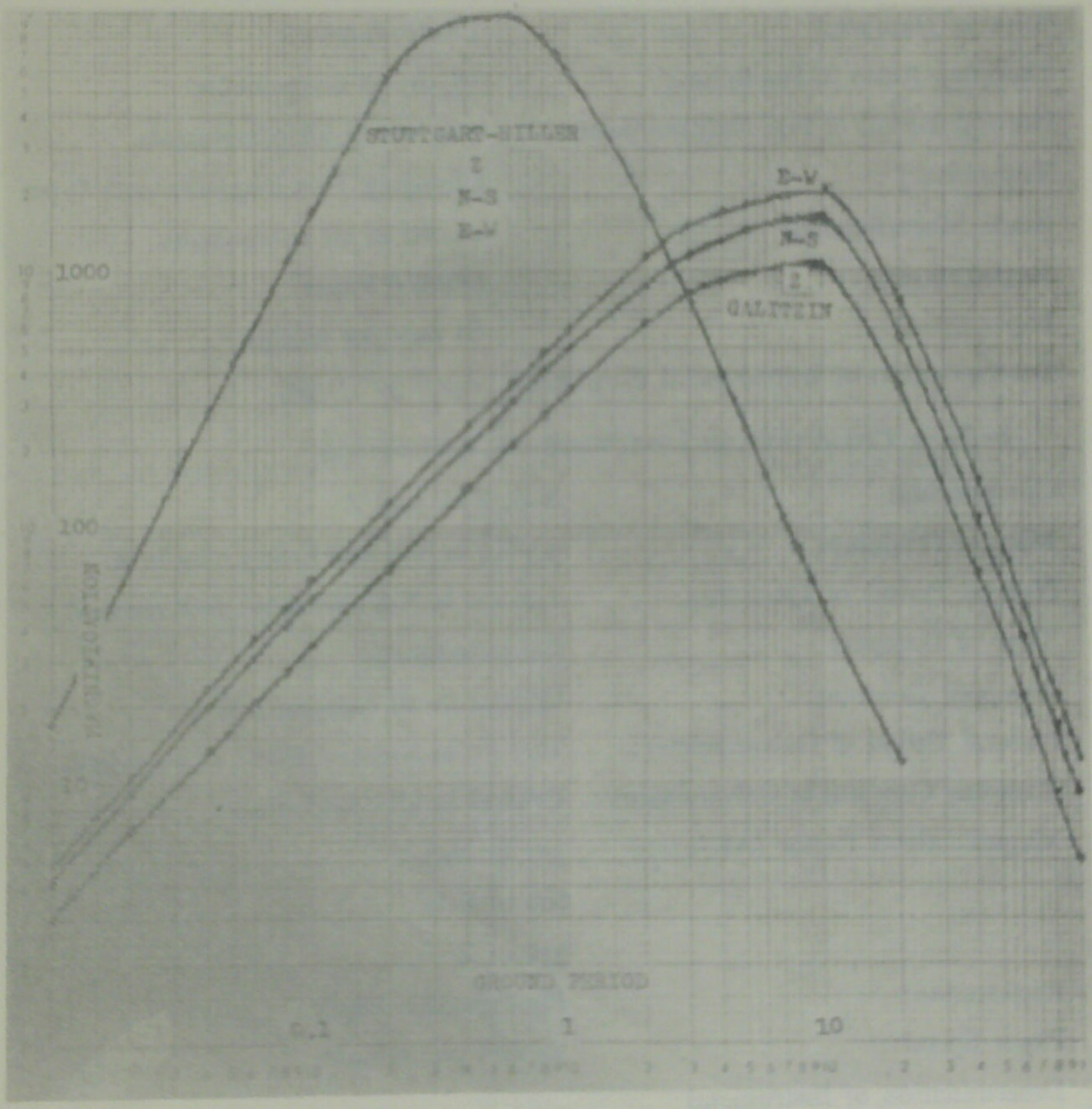


Fig. 1

2—**Time-Marking System**

Minute signals from the slave clock with electric contact and hour signals directly from the master clock are placed on the seismogram through the ordinary relay mechanism. Time marks are indicated by shifting the trace in Stuttgart-Hiller seismograph and by interruption of the optical beam in Galitzin.

3—**Time Signals**

Wireless time signals of the British Broadcasting Corporation or of W.W.V. and Moscow are received every day, and at the begining and at the end of the recording, these signals are directly placed on the seismograms. Time correction is effected by comparison of the time delay between time signals and the master clock minute-mark on the seismograms, and the accuracy achieved is within 0.1 sec.

B—**Tabriz Station**

1—**Location**

a- Geographical Coordinates

Latitude	38° 04′ 03″ N
Longitude	45° 19′ 36″ E

b- Geocentric Direction Cosines a, b, c, and the height are given as below:

a = +0.54010

b = +0.57088

c = +0.61400

Height = 1430 meters

c- Site

The station is located in the valley of Tabriz river, on the southwestern edge of the city of Tabriz on new Tabriz University campus. The surrounding countryside is low lying sand and clay hills.

The Station is constructed on hard formations about three meters in thickness. Below the hardpart is unconsolidated coarse grain sand. Sediment thickness below the station is not known but believed to be several hundred meters.

e- Instrumental Foundations

The foundations of the instruments are sunk some 10 meters down.

2—**Instruments:**

Two complete sets of WWSS types are operating

a- Short Period Seismographs

Components	N-S, E-W and Z
Mass of Pendulum	107.5 kg. in all components
Natural Period of Pendulum	1.0 sec in all components
Natural Period of Galvanometer	0.75 sec in all components
Type of Damper	Electromagnetic
Damping of Galvanometer	Critical in all components
Damping Ratio	17/1 in all components
Magnification	12,500 in all components for 1 sec.
Motor Constant	2.0 in all components

b- Long Period Seismographs

Components	N-S, E-W and Z
Mass of Pendulum	10.75 Kg. in N-S and E-W; 11.2 Kg. in Z
Natural Period of Pendulum	15 sec in all components
Natural Period of Galvanometer	100 sec in all components
Type of Damper	Electromagnetic
Damping of Galvanometer	Critical in all components
Magnification	1500 in all components for 15 sec.
Motor Constant	0.0980 in E-W
	0.0965 in N-S
	0.1053 in Z

Determination of the instrumental constants

August 10th 1965

The overall Magnification Curves of the Seismagraphs are shown in Fig. 2.

C—**Mashad Station**

1—**Location**

a- Geographical Coordinates

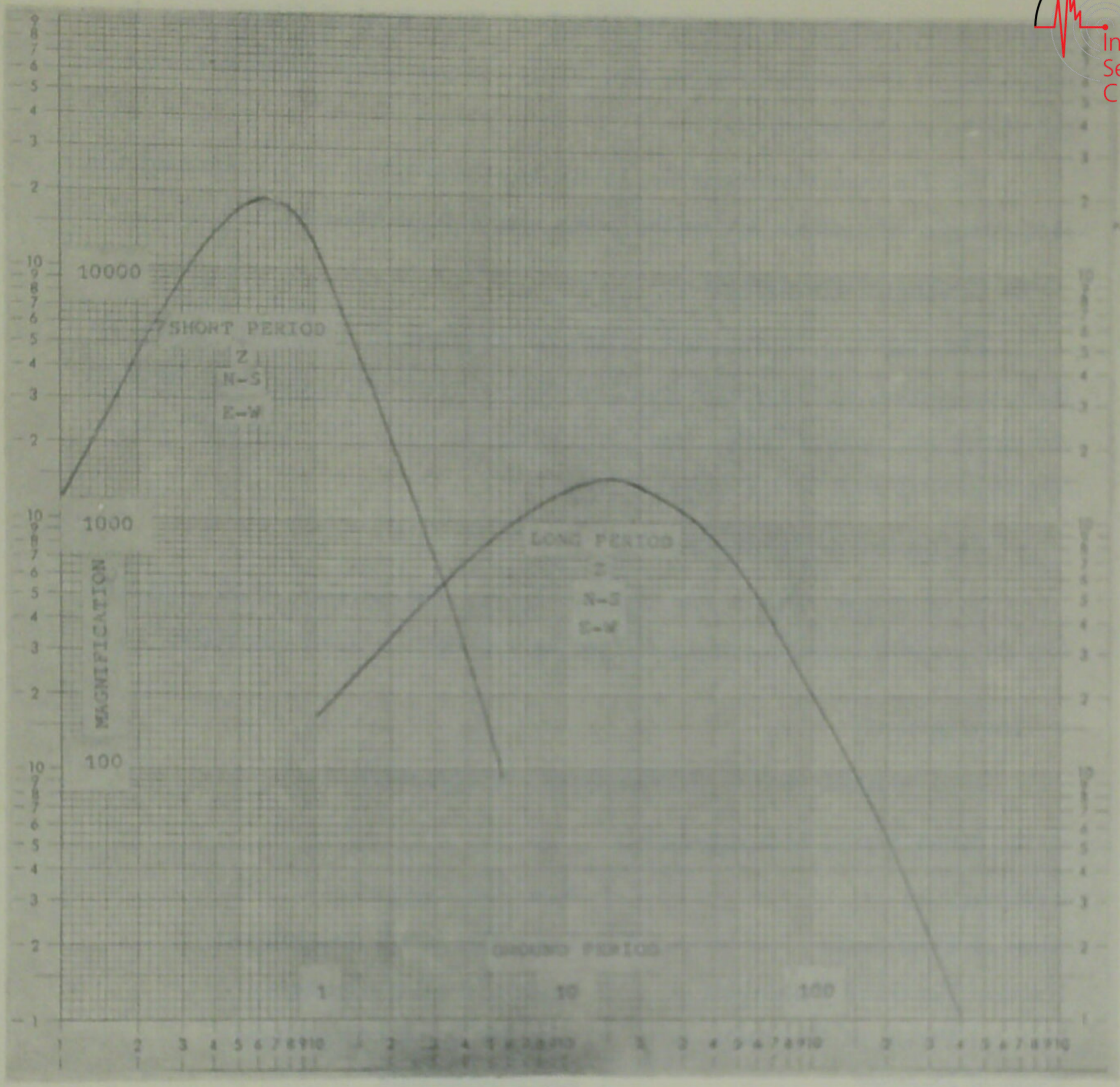


Fig. 2

Latitude 36° 18′ 40″ N.

Longitude 59° 35′ 16″ E.

b- Geocentric Direction Cosines a,b,c, and the height are given as below:

a = +0.39654

b = +0.67468

c = +0.62251

Height = 987 meters

c- Site

The station is located in the valley of the Kashaf River on the

southwestern portion of the city of Mashad. The Kashaf River runs in a northwest to southwest direction and is approximately six kilometers east of the city at its closest point.

The Binalud Mountains lies to the west and south of the city and the Hezarmasjid Mountanis are to the north and east of Mashad.

d- Geological Formations

The station is constructed on alluvial deposite of unknown depth. At the construction site some one hundred meters from the station the exposed sediments are unconsolidated sand and conglomerates. The exposed area is approximately sixty feet in depth.

e- Instrumental Foundations

Seismograph vault is four meters below the ground level and the foundation of the instruments are sunk some 6 meters below the level.

2—**Instruments**

Two complete sets of WWSS types are operating

a- Short Period Seismographs

Components:	N-S, E-W and Z
Mass of Pendulum:	107.5 Kg. in all components
Natural Period of Pendulum	1.0 sec in all components
Natural Period of Galvanometer	0.75 sec in all components
Type of Damper	Electromagnetic
Damping of Galvanometer	Critical in all components
Damping Ratio	17/1 in all components
Magnification	12,500 in all components for 1 sec.
Motor Constant	2.0 in all components

b- Long Period

Components	N-S, E-W and Z
Mass of Pendulum	10.75 Kg. in N-S and E-W 11.2 Kg. in Z
Natural Period of Pendulum	15 sec in all components

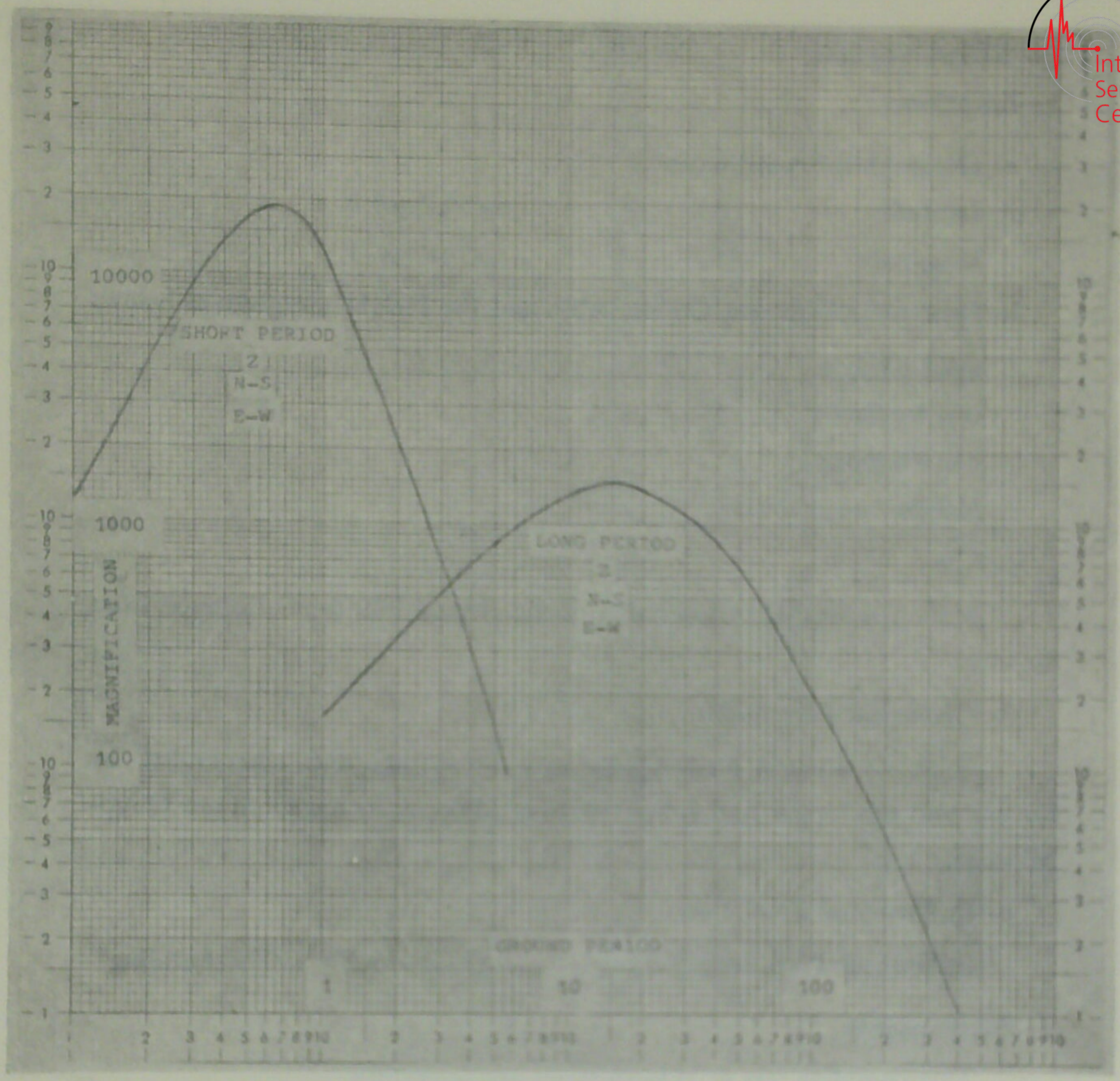


Fig. 3

Natural Period of Galvanometer	100 sec in all components
Type of Damper	Electromagnetic
Damping of Galvanometer	Critical in all components
Magnification	1,500 in all components for 15 sec.
Motor Constant	0.1022 in N-S
	0.1010 in E-W
	0.1026 in Z

Determination of Instrumental Constants
September 15th 1965

The overall Magnification Curves of the Seismographs are shown in Fig. 3.

D—**Shiraz Station**

1—**Location**

a- Geographical coordinates

Latitude	29° 30' 40" N
Longitude	52° 31' 34" E

b- Geocentric Direction Cosines a,b,c and the Height are given as below:

a = +0.52972

b = +0.69067

c = +0.49225

Height = 1959 meters

c- Site

Station is located in the north of the city on hills some distance from the city.

d- Geological Formations

Shiraz is situated on a Quaternary Formation and surrounded by Eocene and the Upper and Lower parts of Miocene to the south are Oligo-Miocene.

e- Instrumental Fondation

Instrument Piers are set directly on rocks in double walled building

2—**Iustruments**

Two complete sets of WWSS types are operating

a- Short Period Seismographs

Components	N-S, E-W and Z
Mass of Pendulum	106,5 Kg. in all components
Natural Period of Pendulum	1.0 sec in all components
Natural Period of Galvanometer	0.75 sec in all components
Type of Damper	Electromagnetic
Damping of Galvanometer	Critical in all Components
Damping Ratio	17/1 in all components
Magnification	100,000 in all components for 1 sec.
Motor Constant	1.0 in all components

b- Long Period Seismographs

Components	N-S, E-W and Z
Mass of Pendulum	10.75 Kg. in N-S and E-W; 11.2 Kg. in Z
Natural Period of Pendulum	15.0 sec in all components
Natural Period of Galvanometer	100 sec in all components
Type of Damper	Electromagnetic

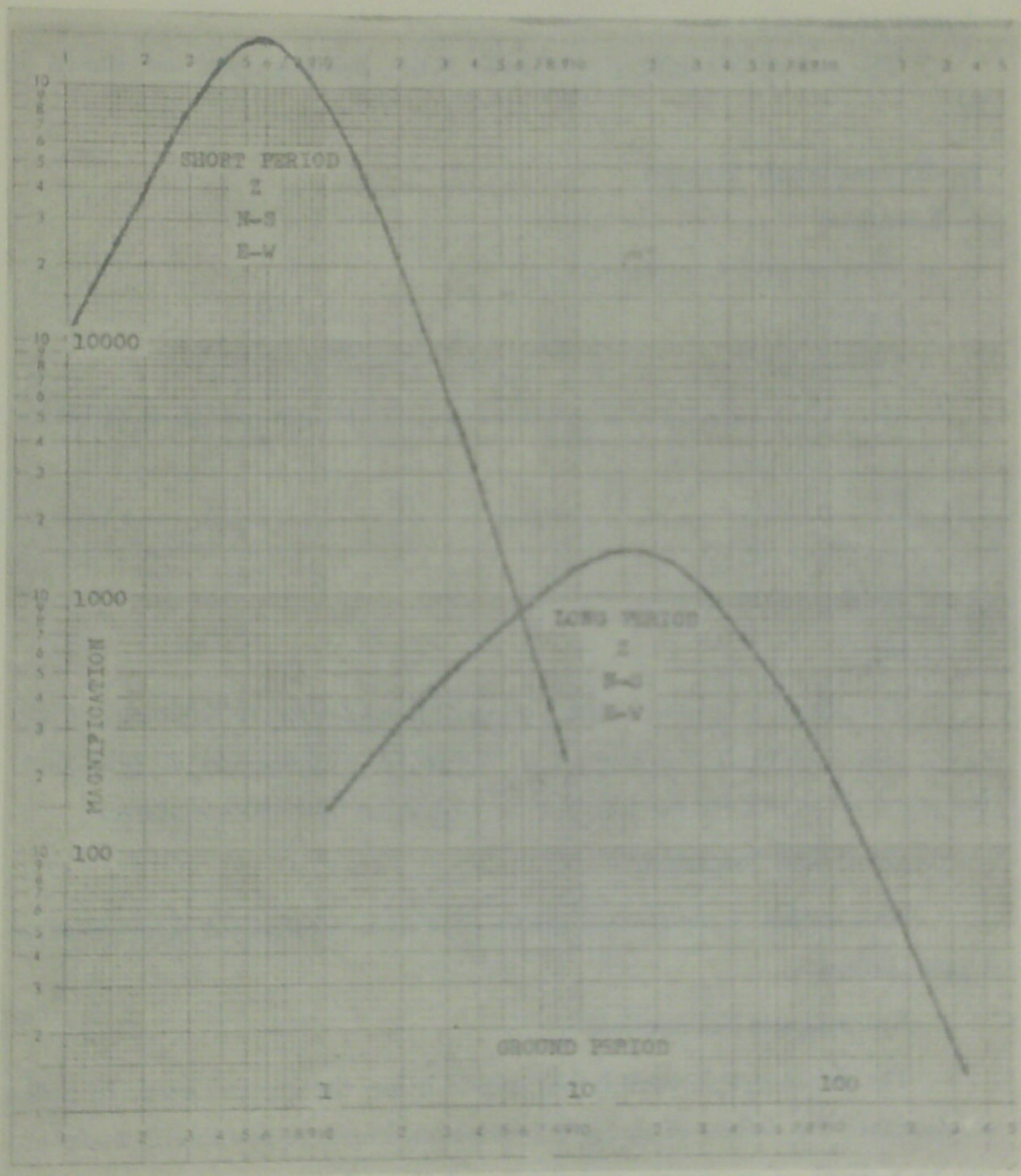


Fig. 4

Damping of Galvanometer	Critical in all components
Magnification	1,500 in all components for 15 sec.
Motor Constant	0.0984 in N-S
	0.1011 in E-W
	0.0997 in Z

Determination of Instrumental Constants:

August 15th 1964

The overall Magnification Curves of the Seismographs are shown in Fig. 4.

E—**Kermanshah Station**

1—**Location**

a- Geographical Coordinates

Latitude	34° 21' 08" N
Longitude	47° 06' 21" E

b- Geocentric Direction Cosines a,b,c and the Height are given as below:

a = +0.56313

b = +0.60606

c = +0.56168

Height = 1310 meters

c- Site

The station is located in the Technical School some 10 Kilometers north of the city. The vault is isolated from the school campus, and includes three underground rooms for the instruments and three office rooms above.

d- Geological Formations

This station is constructed on the massive, Cretaceous Limestone to Upper Jurassic.

e- Instrumental Foundations

The Seismograph vault is four meters below the ground level. In order to eliminate the defects of the soft foundation, concrete reenforced shafts are run to a depth of 20 meters and the foundation of the instrument are based on these shafts.

2—**Instruments**

Stuttgart-Hiller Seismograph with Transistor Amplifier.

Components	N-S, E-W and Z
Mass of Pendulum	700 gr. in all components
Effective Natural Period of Pendulum	1.1 sec. in all components
Type of Damper	Electromagnetic
Damping Ratio of Pendulum	10/1 in all components
Natural Period of Pen-Galvanometer	0.25 sec in all components
Transducer	Changing Flux Displacement type
Static Magnification	6,000 in all components

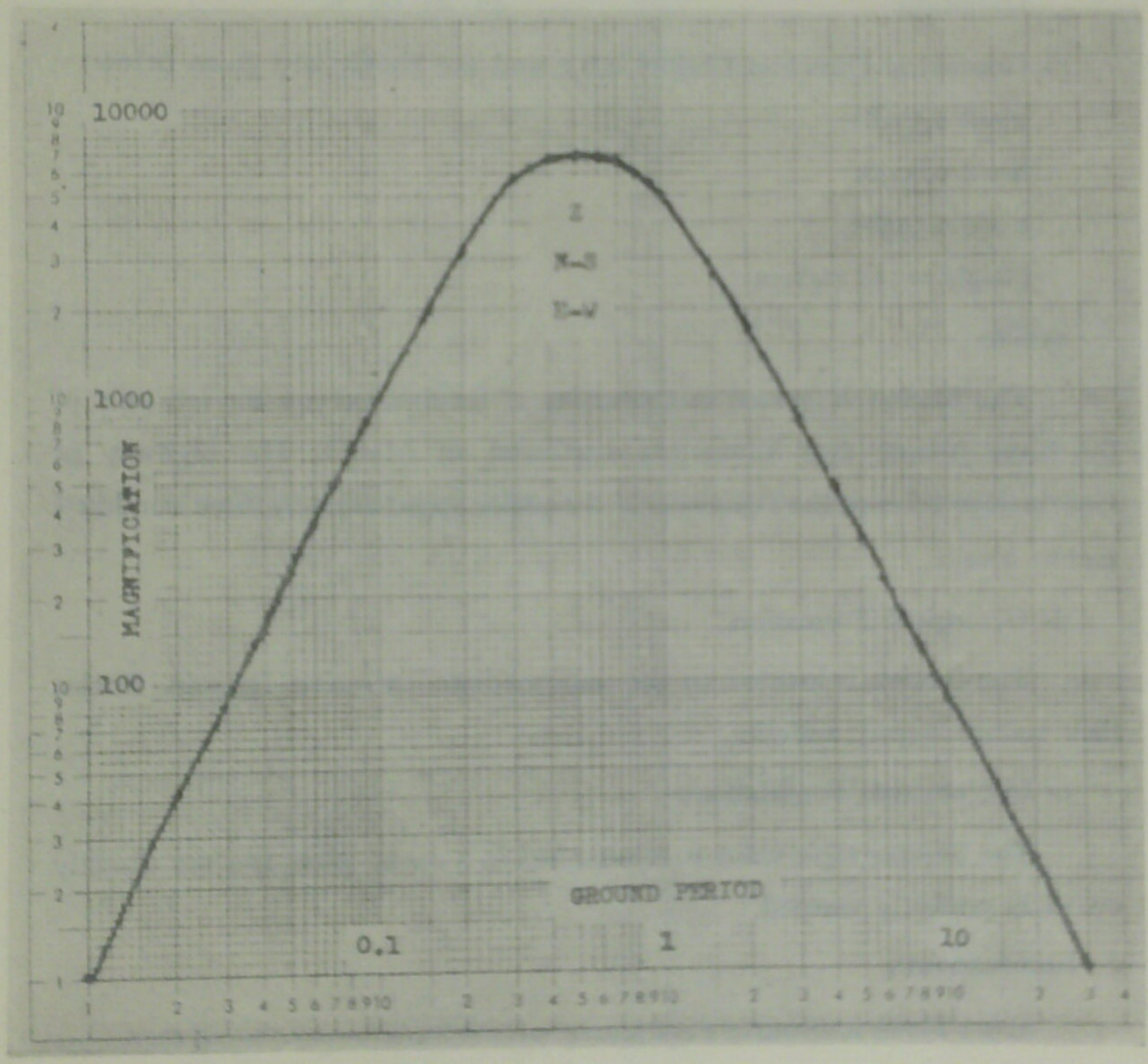


Fig. 5

Registration smoked Paper

Paper speed 60 mm per minute

Determination of Instrumental Constants

April 15th, 1965

The overall Magnification Curves of the Seismographs are shown in Fig. 5.

F—**Manjil Station**

1—**Location**

a- Geographical Coordinates

Latitude 36° 45′ 30″N

Longitude 49° 23′ 00″ E

b- Geocentric Direction Cosines a,b,c and the Height are given below:

a = +0.52281

b = +0.60961

c = +0.59583

Height = 240 meters

c- Site

The Station is located in the valley of Sefid-Roud on the left side of the River aboute two kilometers northwest of Manjil. The highway of Gazvin-Resht lies in the right side of the valley approximately three hundered meters away.

d- Geological Formation

The Station is located on the intermediate extrusive Igneous Rocks, their nature is gray andesite.

e- Instrumental Foundations

The Seismograph valut is constructed in a cave, piers are set directly on rocks perfectly scarped.

2—**Instruments**

Short Perid Labrouste Pendulums with Schlumberger-Picard Galvanometers, Type AV 17.

Components	NE-SW, ES-WN, and Z
"N 28 E and E 28 S"	
Natural Petiod of Pendulum	0.62 sec in two horizontal componeuts and 0.9 sec in Z
Damping Constant	2.653 in she horizontal components and 1.546 in Z
Natural Period of Galvanometer	0.45 sec in all components
Damping Constant	3.25 in the horizontal components and 3.66 in Z
Registration	Photographic Paper
Paper speed	60 mm per minute

Determination of Instrumental Constants :

May 15th 1964

The overall Magnification Curves of the Seismographs are shown in Fig. 6.

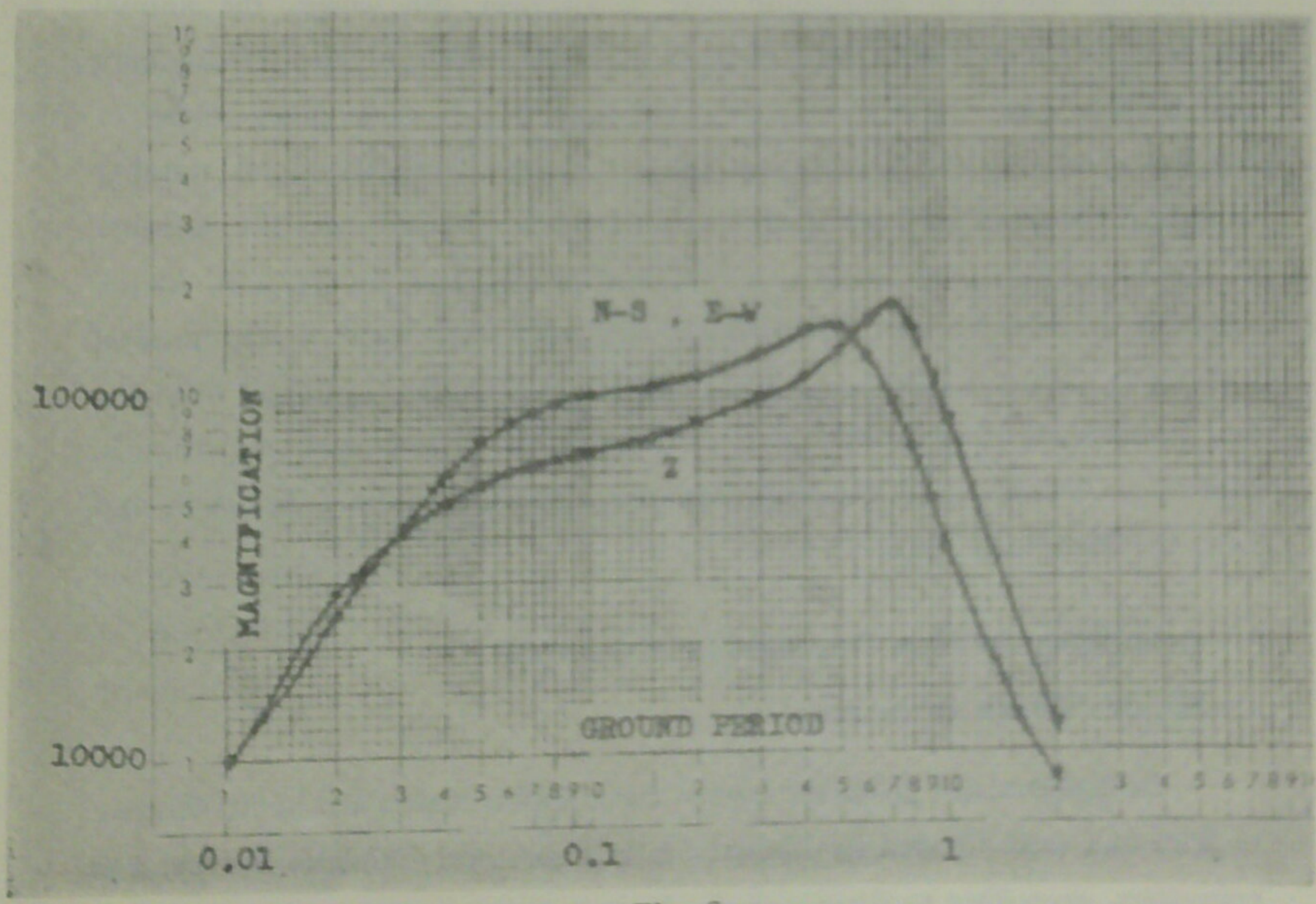


Fig. 6

IV—**Earthquakes recorded in the Stations During 1966**

Table 1 gives the monthly number of the shocks as registered by the United States Coast and Geodetic Survey, the monthly number of shocks located by USCGS and also registered at Tehran station and the monthly number of all shocks registered at The Provincial Stations.

The numbers in the parentheses indicate the shocks which took place in the Plateau of Iran.

From the above Table 8,97 percent of all shocks located by USCGS are recorded at Tehran station, and naturally the number of all shocks registered in Tehran includes local shocks which cannot be located by USCGS.

Considering the sensitivities of the seismographs in Tehran station and comparing the recorded shocks in Tehran with their epicentre and magnitude, Tehran station can record shocks even in the antipodal regions, if magnitude is over 6. The number 428 in the second column of Table 1 indicates the number of shocks of magnitude over 5 all over the world, the annual frequency of which is about 140 according to the statistics given by Gutenberg and Richter, and shocks of smaller magnitude, which took place more or less nearer to Iran. If this number 428 is deducted from the total number of 841 in the third column, the remaining figure 413 indicates the number of shocks registered by Tehran station, but not located by USCGS. At the moment, 172 shocks out of 413 shocks are obviously local shocks around Tehran (Epicentral Distance is less than 500 kilometers.), judging from the fact that the duration from P to S of these shocks is less than 60 seconds, table 3 according to the remainig shocks are probably minor shocks in and near the Plateau of Iran.

V—**Seismicity in Iran During The Year 1966**

1—**Major Shocks in in Iran**

In Table 2 are given the earthquakes which took place in the Plateau of Iran and were located by United States Coast and Geodetic Survey. The epicenters, according to their magnitude, are shown in Map. I

Table 1

Month	Located by USCGS	Located by USCGS Reg. in TEH.	All shock Reg. in TEH.	All shock Reg. in TAB.	All shock Reg. in MSH.	All shock Reg. in SHI.	All chock Reg. in KER.
January	366 (1)	22	85	74	94	171	62
February	356 (2)	35	62	98	86	174	55
March	432 (1)	31	60	139	97	217	60
April	391 (–)	42	64	81	96	130	63
May	442 (–)	42	76	120	105	174	78
June	426 (2)	39	83	100	91	179	67
July	353 (7)	43	94	112	134	173	65
August	472 (2)	48	80	222	137	56	105
September	419 (4)	30	68	136	80	230	100
October	396 (2)	25	53	138	90	157	64
November	367 (2)	33	60	82	54	145	36
December	351 (1)	38	56	107	58	191	58
Total	4771(24)	428	841	1409	1122	1997	813

Table 2

No.	Date	Time Origin	Epicentre	depth Km.	Geographical Location	Magnitude
1.	Jan. 16	20 02 09	30.8 N, 50.2 E.	33	Iran	4.4 (CGS)
2.	Feb. 1	07 07 45.8	35.1 N, 46.0 E.	4	Iran-Iraq Border Region	4.4
3.	Feb. 26	20 50 37.2	30.5 N, 50.8 E.	60	Iran	4.7
4.	Mar. 15	10 38 29	34.4 N, 46.0 E.	33	Western Iran	4.2
5.	Jun. 9	22 24 39.0	27.6 N, 52.5 E.	8	Southern Iran	5.2
6.	Jun. 26	11 52 18	32.7 N, 48.5 E.	33	Western Iran	4.7
7.	July 27	14 49 02.0	32.6 N, 48.8 E.	36	Western Iran	5.5
8.	July 27	15 30 26.4	32.6 N, 48.8 E.	45	Western Iran	3.9
9.	July 27	17 06 02	32.6 N, 49.3 E.	74	Western Iran	—
10.	July 27	18 06 34	32.8 N, 48.7 E.	36	Western Iran	4.9
11.	July 27	19 40 09.6	32.6 N, 49.0 E.	54	Western Iran	5.2
12.	July 27	21 10 09	32.6 N, 49.0 E.	60	Western Iran	—
13.	July 29	08 20 46	28.5 N, 51.6 E.	33	Southern Iran	4.8
14.	Aug. 9	00 20 00	32.8 N, 48.7 E.	54	Western Iran	4.2
15.	Aug. 30	06 42 26	32.2 N, 56.1 E.	33	Iran	—
16.	Sept. 2	11 13 00	27.7 N, 52.4 E.	33	Southern Iran	5.0
17.	Sept. 18	20 43 53.3	27.8 N, 54.3 E.	16	Southern Iran	6.2
18.	Sept. 24	10 00 46.4	27.4 N, 54.5 E.	33	Southern Iran	5.4
19.	Sept. 29	17 44 34	27.9 N, 54.3 E.	25	Southern Iran	4.9
20.	Oct. 3	17 05 10.4	35.7 N, 53.2 E.	35	Iran	4.9
21.	Oct. 24	14 31 21	37.7 N, 59.0 E.	33	Iran-USSR Border Region Felt at Mashad, Iran.	5.0
22.	Nov. 8	03 14 10.1	36.1 N, 50.9 E.	23	Iran	—
23.	Nov. 26	13 49 30	37.7 N, 58.6 E.	29	Iran USSR Border Region	4.9
24.	Dec. 2	03 07 54.0	28.2 N, 53.2 E.	40	Southern Iran	5.2

In Table 2 Origin-Time, Epicentre, Magnitude and Depth as determined by USCGS.

From Table 2 and Map I it is seen that 24 shocks took place in the year 1966 which were large enough to be located by USCGS.

Since the Plateau of Iran is a part of a broadened section of the Alpide Seismic Belt, a number of shocks also took place in the Caspian Sea, Northern, Northeastern, and Western parts of Iran that we have not shown in Map I and Table 2.

2—**Local Seismicity near Tehran**

As shown below, Tehran station has recorded a number of local shocks, the S—P time of which is less than 60 sec.

Table 3

Frequency of Local Shocks (S—P: Less than 60 sec.)

Month	Number	Month	Number	Month	Number
January	13	May	17	September	24
February	9	June	12	October	12
March	13	July	27	November	9
April	15	August	15	December	6

3—**Magnitude**

In order to determine the Magnitude of earthquakes occuring in the Iranian Plateau, a formula is derived by J.Sh. Taheri in the year 1967. This formula is based on data from 98 shocks which were recorded by Stuttgart-Hiller short period seismographs in Tehran station during the years 1961-1966.

These earthquakes have a range of distances from 150-1000 Km. and a depth of focus mostly from 30-40 Km.

The formula can be written as follows:

$$M = \text{Log.}\ \frac{A}{T} + (3.39 \pm 0.19)\ \text{Log}\triangle - (4.69 \pm 0.51)$$

where:

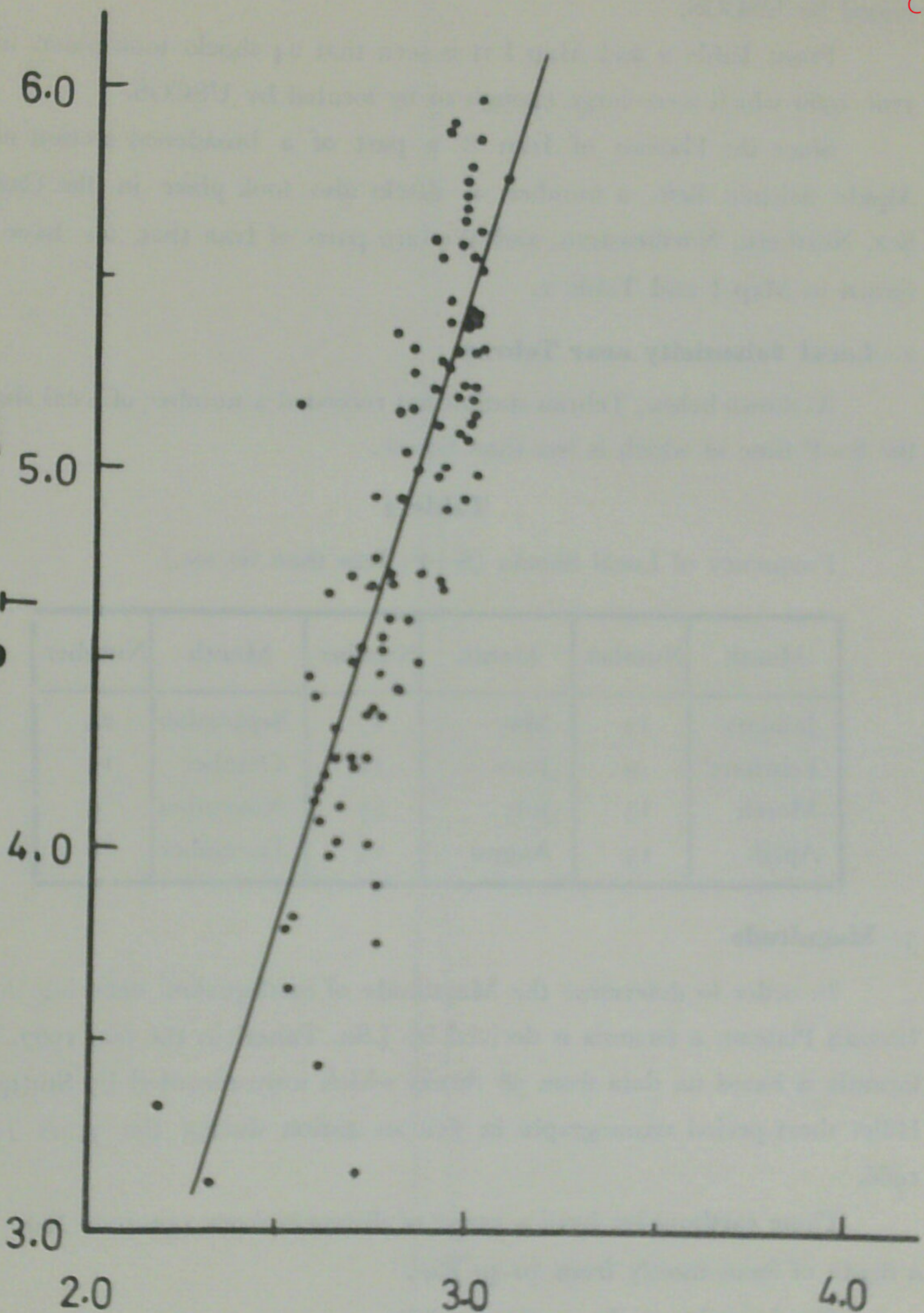


Fig. 7

A = Max. ground amplitude of (S) wave which have been found from E-W and N-S components in Microns.

T = Perod of (S) waves corresponding to A in seconds.

$\triangle$ = Epicentral distance in Kilometers.

The distribution curve of $(M\text{-}Log \frac{A}{T})$ versus $Log \triangle$ is shown in Fig. 7.

VI—**Publications**

The Stations of the Iranian Seismological Network are issuing six regular publications "Weekly Provisional Readings of Earthquakes" in the stations, and "Monthly Seismological Bulletin" in Tehran Station. In the former, all shocks are read in the seismological stations, and the data are airmailed to USCGS to contribute to the preliminary Determination of Epicentres, and also to Strasbourg and Uppsala. The latter bulletin contains readings of all shocks registered in the Network and sent to the seismological stations and concerned organizations all over world.

Furthermore the necessary data for the perforated card system of the ISRC, University of Edinburgh are marked and mailed to this centre.

The yearly bulletin of all the seismological stations for the year 1966 are processed and distributed not only to all the seismological siations in the International Net, but also to all Institutions interested in Earthquake Engineering.

At the present, the results include P & S waves for the provincial stations and all waves for Tehran Station. In coming years the complete analysis of all waves will be given.

VII—**Future Plans**

Owing to the ground disturbances and in view of the fact that high amplifications are causing serious troubles, it is intended to displace the stations Mashad, Tabriz and Kermanshah.

Geological studies are in progress regarding the choice of the site and after the studies are complete and the credit is available, then the construction will start and the stations will be displaced.

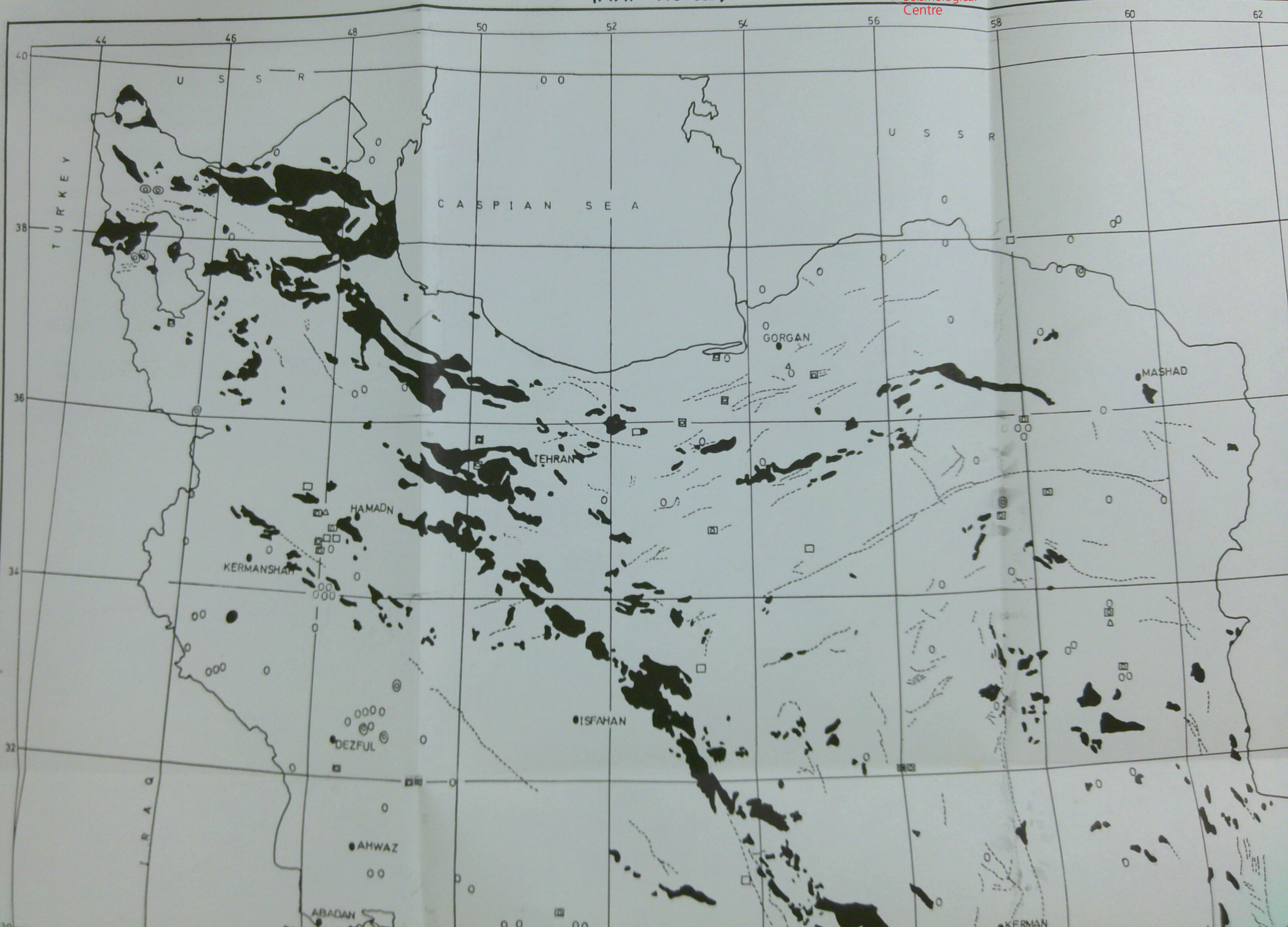
VIII—**Antiseismic Construction Code**

Since the Plateau of Iran lies in the Alpide Seismic Belt, a Construction Code is of utmost value to safeguard life and property.

A code based on observational data and the Seismicity Problems of the country has been prepared and will be duly legalized and enforced.

The Code in now published.

(MAP NO. III)



(MAP NO. III)

ISFAHAN
DEZFUL
AHWAZ
ABADAN
KERMAN
SHIRAZ
LAR
BANDAR ABAS
I R A Q
P E R S I A N G U L F
34
32
30
28
50
52
54
56
58

EARTHQUAKE MAP OF IRAN

MODIFIED MERCALLY EARTHQUAKE INTENSITY SCALE

STRUCTURAL(TECTONIC) DEEP-SEATED(PLUTO

- 5 (SLIGHT CRACKS)
- 6 (CRACKS CONSIDERABLE)
- 7-8 (SLIGHT DAMAGE)
- 8-10(DAMAGE CONSIDERABL)
- 10-12(DAMAGE TOTAL)
- 8-10(DAMAGE CONSIDERABLE)
- 10-12(DAMAGE TOTAL)

GEOLOGICAL FEATURES

- ISNEOUS OUTCRPS (ACID-BASIC ULTRABASIC
- FAULT-THRUSTS

SCALE 1:10,000,000

GEOLOGIST IN CHARGE M. SHARIATMADARI

Map No III

ISFAHAN
DEZFUL
AHWAZ
ABADAN
SHIRAZ
KERMAN
LAR
BANDAR ABAS
PAKISTAN
G U L F
30
28
26
24
50
52
54
56
58
60
62

E MAP OF IRAN

ARTHOUAKE INTENSITY SCALE

IC) DEEP-SEATED(PLUTO

) ◎ 8-10(DAMAGE CONSIDERABLE)
ERABLE) ◎ 10-12(DAMAGE TOTAL)
E)
DERABL)
)

AL FEATURES

US OUTCRPS (ACID-BASIC ULTRABASIC
-THRUSTS

10,000,000

E M. SHARIATMADARI

EARTHQUAKE MAP OF IRAN
COMPILED AT
THE INSTITUTE OF GEOPHYSICS
TEHRAN UNIVERSITY
1966

III on draw

SEISMICITY MAP OF THE PLATEAU OF IRAN IN 1961 - 1966 (MAP No. II)

SEISMICITY MAP OF THE PLATEAU OF IRAN IN 1961 - 1966 (MAP No. II)

46° 48° 50° 52° 54° 56° 58° 60° 62° 64°

U S S R

U S S R

CASPIAN SEA

TABRIZ

MENJIL

TEHRAN

KERMANSHAH

ISFAHAN

MESHED

AFGHANISTAN

IRAQ

International Seismological Centre

Map no 11

MAGNITUDE

- 4.0-4.9
- 5.0-5.9
- 6.0-6.9
- 7.0-7.9

SAUDI ARABI

EL BORAZJAN

SHIRAZ

1940

32°
30°
28°
46°
48°
50°
52°
54°
56°
58°
60°

ISFAHAN

SHIRAZ

RAQ

ARABI

PERSIAN GULF

PAKISTAN

International Seismological Centre

30°

28°

26°

48°

50°

52°

54°

56°

58°

60°

62°

Map no 11

SEISMICITY MAP OF THE PLATEAU OF IRAN IN 1966 (MAP No. I)

44° 46° 48° 50° 52° 54° 56° 58° 60° 62°

38° 36° 34° 32°

U S S R

U S S R

TURKEY

CASPIAN SEA

TABRIZ

MENJIL

MESHED

TEHRAN

KERMANSHAH

ISFAHAN

I R A Q

SEISMICITY MAP OF THE PLATEAU OF IRAN IN 1966 (MAP No. I)

46° 48° 50° 52° 54° 56° 58° 60° 62° 64°

40° 38° 36° 34° 32° 30°

S S R

U S S R

CASPIAN SEA

TABRIZ

MENJIL

TEHRAN

KERMANSHAH

ISFAHAN

MESHED

AFGHANISTAN