

MEXICAN NATIONAL REPORT
ON
SEISMOLOGY
AND PHYSICS OF THE EARTH'S INTERIOR
PRESENTED TO THE XIVth GENERAL ASSEMBLY
OF THE INTERNATIONAL UNION
OF GEODESY AND GEOPHYSICS

Zurich, Sept. 26 - Oct. 7, 1967.

MEXICO, 1967

INTRODUCTION. Seismological work of pure and applied character is done in Mexico by a number of institutions, namely, the Institute of Geophysics of the National Autonomous University of Mexico (with 11 stations and observatories throughout the country), the Institute of Engineering of the N.A.U.M. (for anti-seismic control), Petróleos Mexicanos (for oil and gas detecting), some Federal agencies (for various purposes as search for minerals, control of different phases of construction of public work and their preservation, etc.) and by private concerns (under contract for the above mentioned agencies). Although some observations on earthquakes and their effects were made in the course of the XIX Century (and even before for their disastrous manifestations), the installation of the first network of seismologic stations took place in the late years of the first decade of this century by the former Geological Institute of Mexico (now a division of the N.A.U.M. under the name of Institute of Geology), and later on transferred to the Institute of Geophysics, as the Mexican Seismological Survey. The introduction of seismic exploration methods was the result of development of the oil industry in the 1920's, and adopted in more recent years by mining companies and the Federal agencies for their own objectives.

In this report a presentation is made of the more important facts related to seismological research in academic institutions and of exploration seismological work by the of agencies as mentioned in previous lines.

J. Figueroa A.,
Chairman, Seismological Department
Institute of Geophysics, N.A.U.M.

NATIONAL AUTONOMOUS UNIVERSITY OF MEXICO

INSTITUTE OF GEOPHYSICS

Its Department of Seismology operates the Mexican Seismological Survey, which includes a central stations at Tacubaya (Mexico, D.F.) and 10 stations distributed in the country as shown in Fig. 1. In this map, stations with direct recording Wiechert seismographs which operate on smoked paper at low amplification are marked by circles and those equipped with electro-magnetic instruments working at high amplifications are indicated by dots. These better equipped stations were established during the lapse of time corresponding to this report (1964-1966), and have the following characteristics:

Presa B. Juárez, Oax.	PBJ	48K	16°29'	N	95°25'	W	h	72m
Vista Hermosa, Oax.	VHM	67K	17°09'	N	96°46'	5"W	h	1,600m
León, Gto.	LNM	30K	21°07'	N	101°40'0.3"W	h	1,800m	
Comitán, Chis.	COM	15K	16°15'12"	N	92°07'41"W	h	1,528m	

Another new station will be installed at Ciudad Universitaria, D. F., (campus of the N.A.U.M.), in a subterranean vault in process of construction, and equipped with long and short period instruments and is to be designated with the letters UNM as one of the VELA-UNIFORM Program in Mexico. Seismographic stations with adequate equipment will also be installed during 1967 in the great dams operated by the Federal Commission of Electricity at El Infiernillo, Mich., Santa Rosa, Jal., La Soledad, Ver. y Malpaso, Chis. These seismographs will be interconnected with accelerographs already working to record portions not collected by them as well as other waves corresponding to maximum accelerations since sensitivity of these seismographs will allow identification of seismic disturbances.

In the same year, as part of the International Upper Mantle Program in Mexico, a network of seismographs will be established along the Neo-Volcanic Axis between parallels 19° and 20° lat N. This project was recommended by Dr. G. R. Robson, Chief of the Seismic Unit of the University of the West Indies, in Trinidad-Tobago, when he visited this country as an expert sent by the UNESCO to examine and discuss with Mexican specialists the possibility of initiating a program of "volcanic watch"; another

recommendation of Dr. Robson has already been implemented through the creation of a Department of Physical Volcanology at the Institute of Geophysics of the N.A.U.M.

SEISMOLOGIC RESEARCH. Data recorded by stations of the Mexican Seismological Survey are published every month in a bulletin that is distributed to many institutions of the world. The number of recorded shocks has notably increased since the installation of better equipped stations with greater sensitivity, as indicated in the following table:

RECORDED MOVEMENTS
(Sep. 1963 — Dec. 1966)

Year	Domestic		Neighbor		Remote		Late		Not classified	Total
	L	NL	L	NL	L	NL	L	NL		
1963	257	17	31	85	8	1	14	1	10	424
1964	1410	4	181	267	66	1	88	1	34	2052
1965	1806	238	269	1198	78		162	10	69	3830
1966	2431	471	387	3027	136	1	253		392	7098

L: localized. NL: Not localized.

Strong shocks like those of July 6, 1964, very destructive at Ciudad Altamirano, Gro., and August 23, 1965, destructive in many sites of the coast of the State of Oaxaca, were subjected to a special study in order to trace the isoseist map in each case. In others, when the good quality of records allowed it, the study of focal depth and fault mechanisms was made. As a joint project of the Institutes of Geophysics and of Engineering of the N.A.U.M. a careful statistical record is also carried for each epicenter including data on periodicity, and energy accumulation and liberation as a basis for a good prediction.

In this way, seismic intensity has been studied to determine its regionalization as in the cases of isoseists of 45 destructive movements throughout the whole seismic history of Mexico shown in Fig. 2, while distribution of maximum seismic intensities are demonstrated for each case in Figs. 3, 4, 5, 6, 7 and 8. A Seismic Chart has also been prepared with data on seismic activity since the installation of recording instruments in the country, as

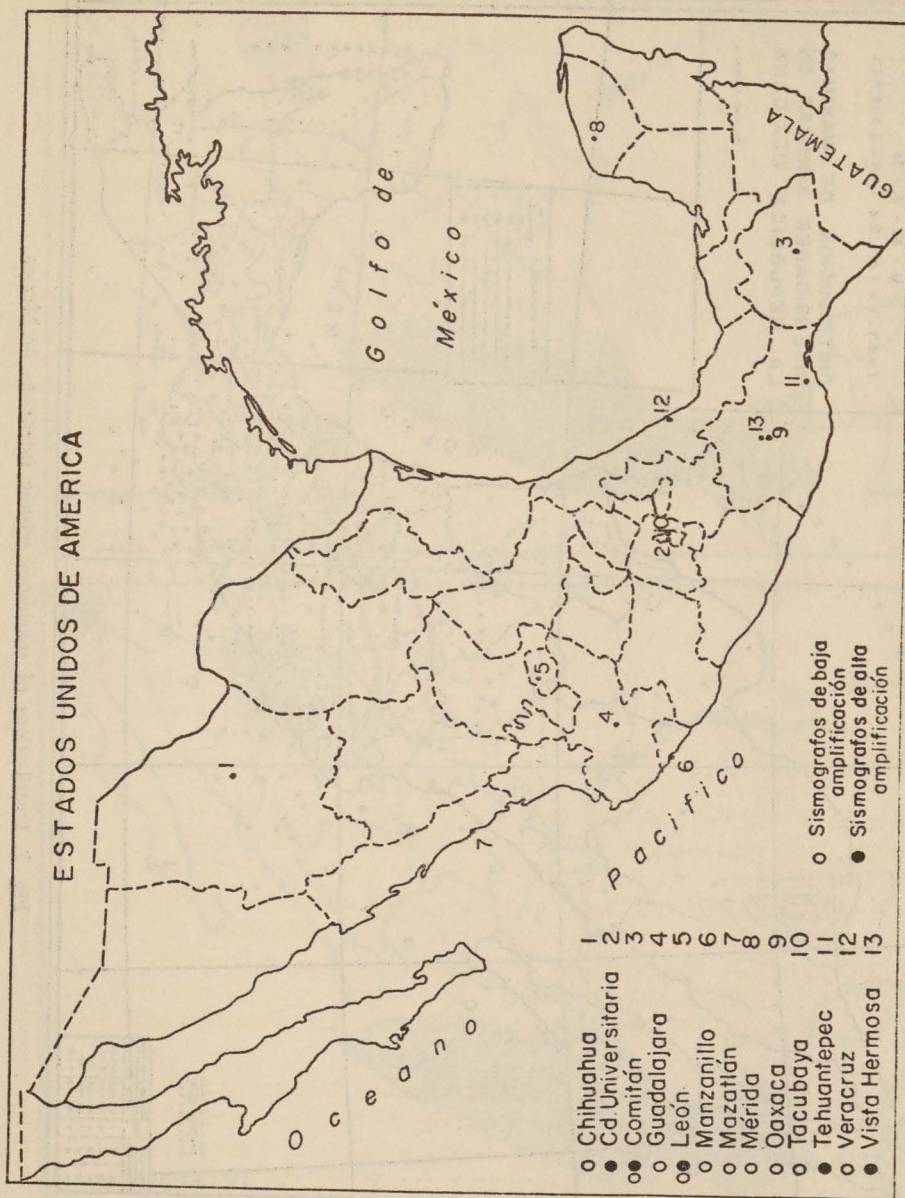


Fig. 1. Distribution of seismological stations in Mexico.

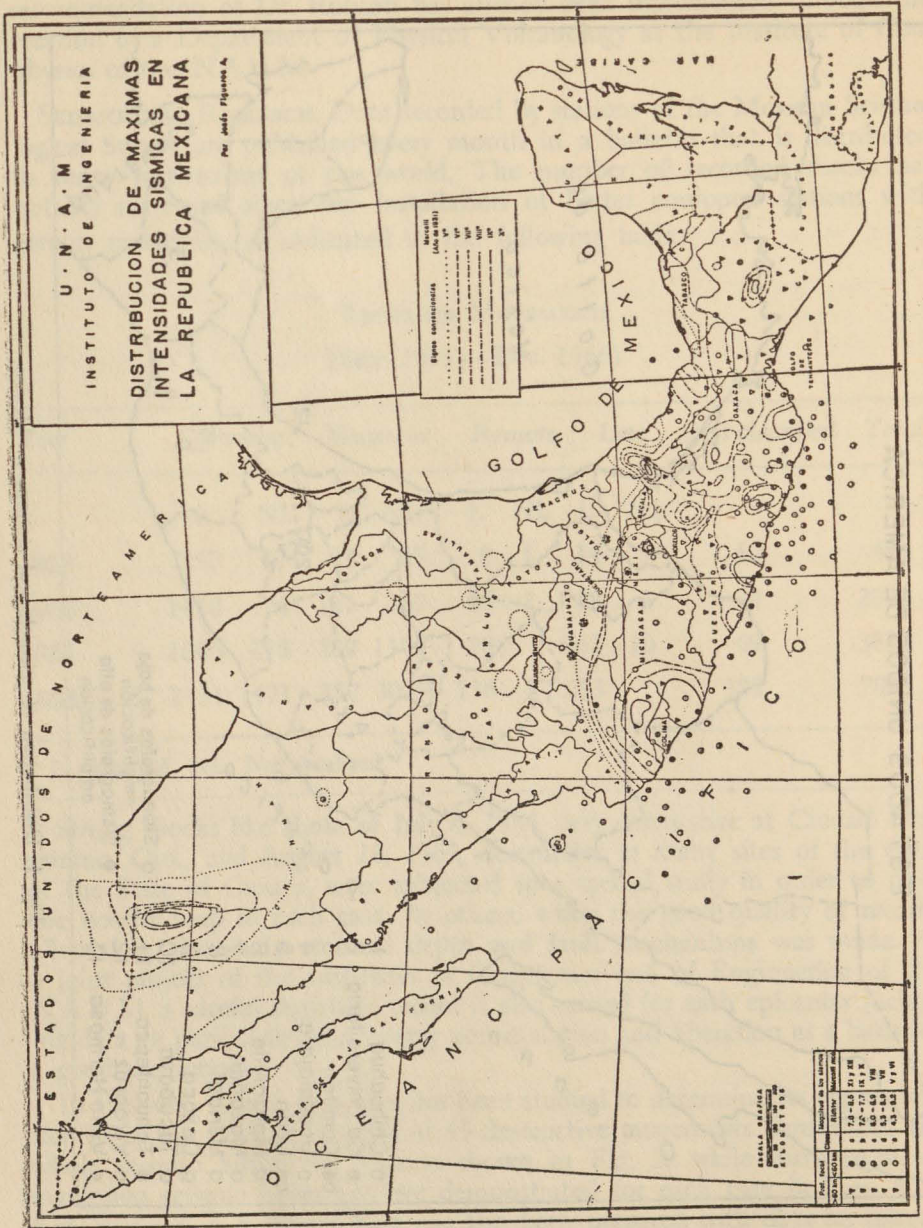
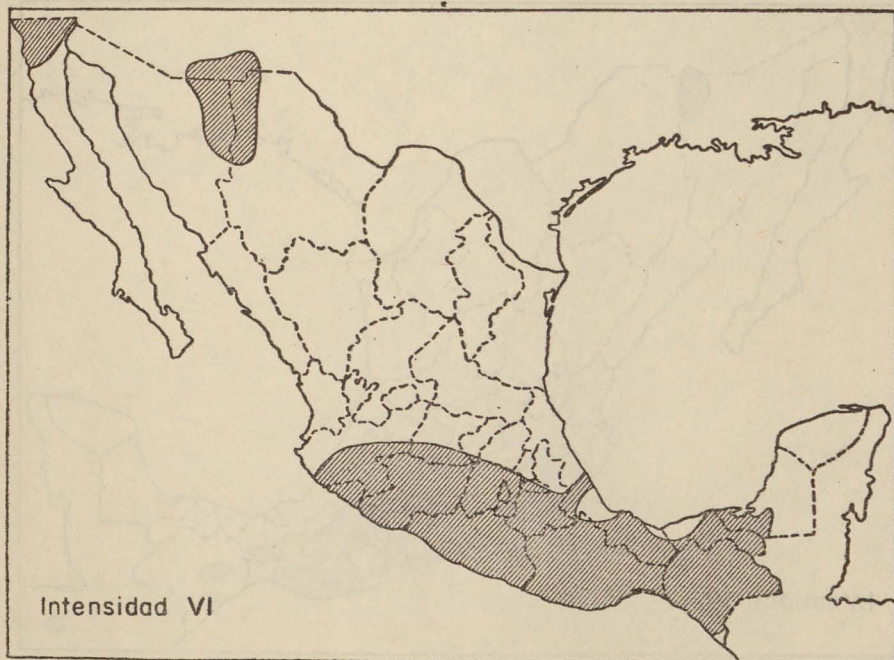
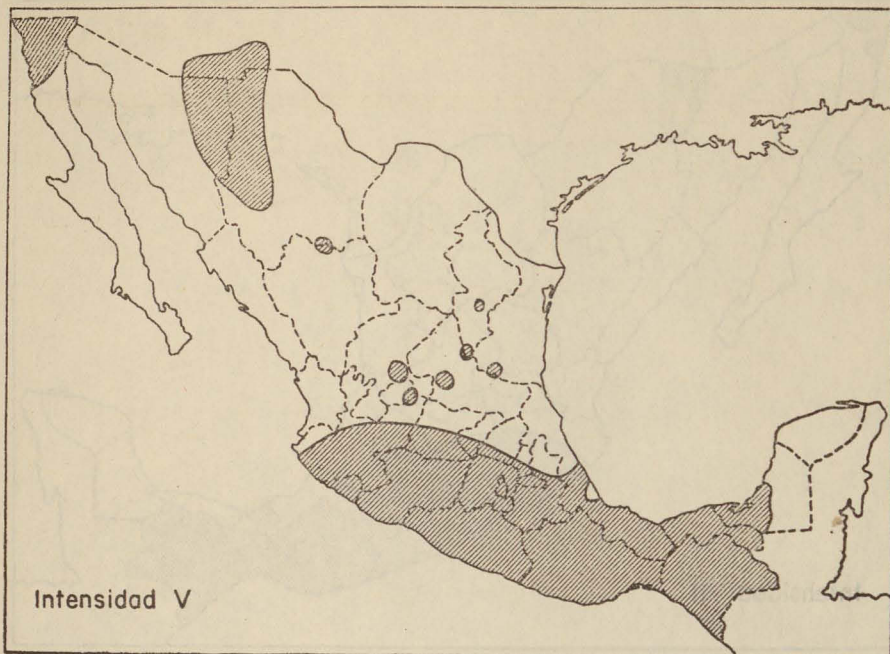
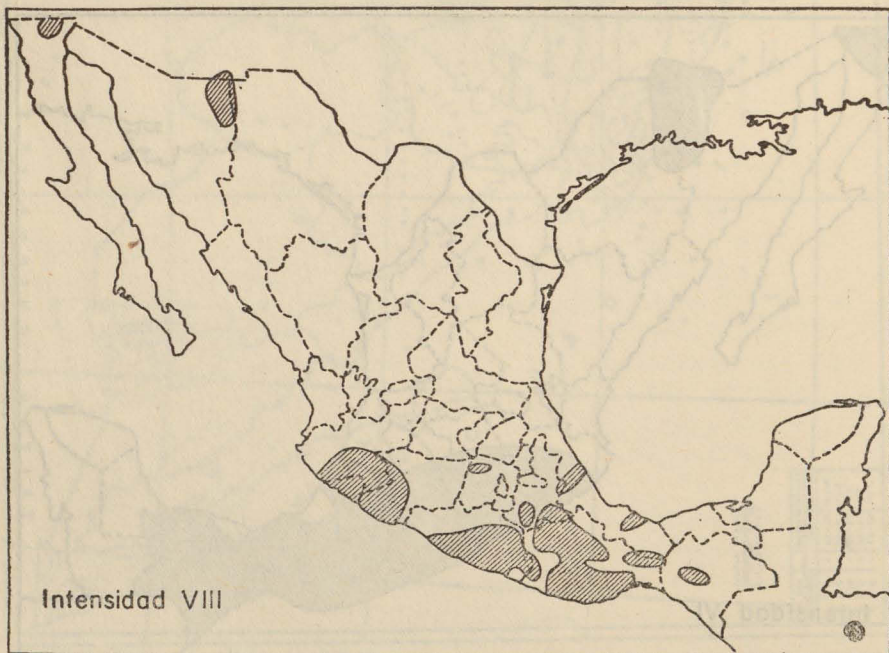
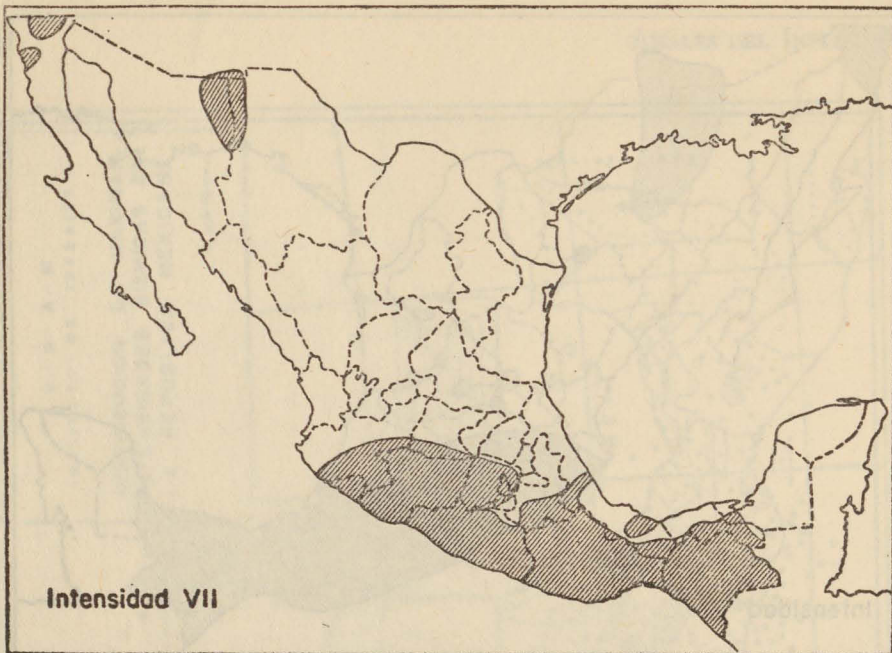
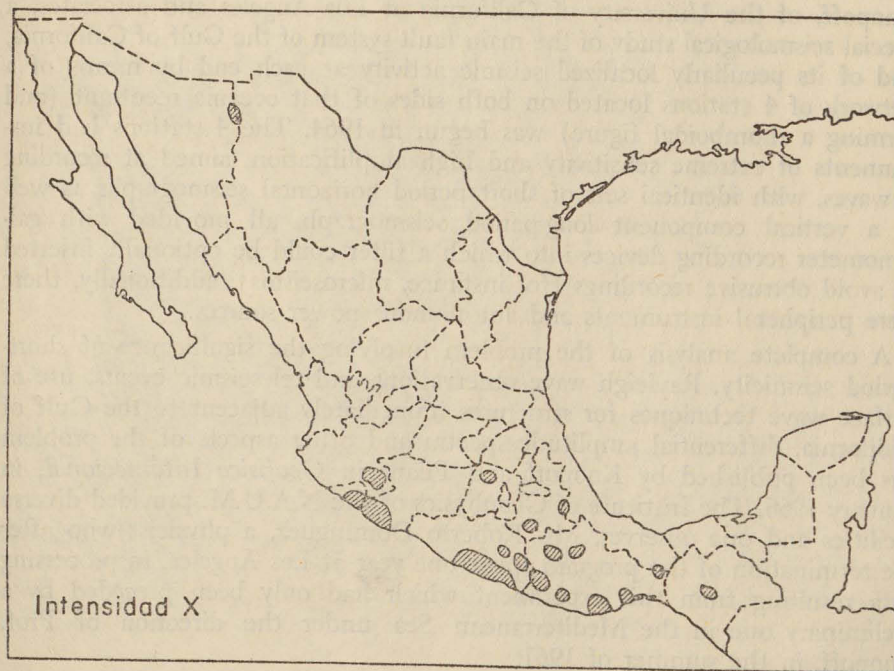
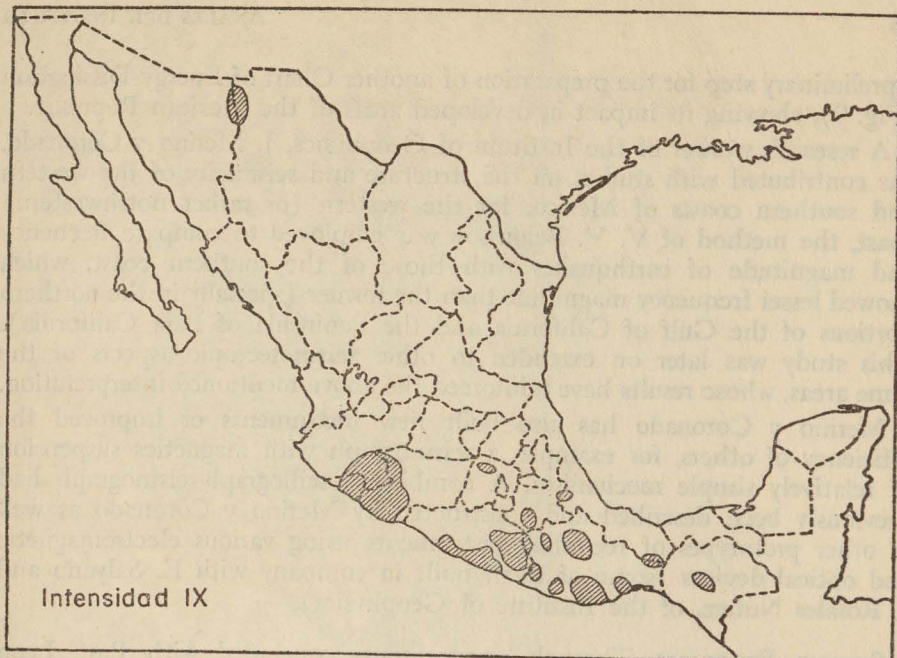


Fig. 2. Distributions of maximum seismic intensities in Mexico.







a preliminary step for the preparation of another Chart of Energy Dissipation (Fig. 9), showing its impact in developed areas of the Mexican Republic.

A research worker of the Institute of Geophysics, J. Merino y Coronado, has contributed with studies on the structure and seismicity of the western and southern coasts of Mexico; for the western (or rather northwestern) coast, the method of V. V. Belousov was employed to compare frequency and magnitude of earthquakes with those of the southern coast, which showed lesser frequency magnitude than the former (specially in the northern portions of the Gulf of California and the Península of Baja California). This study was later on extended to other seismotectonic aspects of the same areas, whose results have reinforced the above mentioned interpretation.

Merino y Coronado has also built new instruments or improved the efficiency of others, for example, a seismograph with magnetic suspension of relatively simple mechanism. A combined oscillograph-seismograph had previously been described and constructed by Merino y Coronado as well as other prototypes of recording instruments using various electromagnetic and optical devices (some of them built in company with E. Salyano and J. Rosales Núñez, of the Institute of Geophysics).

SPECIAL PROGRAMS. Through arrangements concluded with Prof. Leon Knopoff, of the University of California at Los Angeles and associates, a special seismological study of the main fault system of the Gulf of California, and of its peculiarly localized seismic activity at each end by means of a network of 4 stations located on both sides of that oceanic reentrant (and forming a rhomboidal figure) was begun in 1964. The 4 stations had instruments of extreme sensitivity and high amplification, aimed at recording P waves, with identical sets of short period horizontal seismographs as well as a vertical component long-period seismograph, all provided with galvanometer recording devices into which a filter could be optionally inserted to avoid obtrusive recordings (for instance, microseisms); additionally, there were peripheral instruments and autonomous power sources.

A complete analysis of the problem involving the significance of short-period seismicity, Rayleigh wave observations and teleseismic events, use of surface wave techniques for structures immediately adjacent to the Gulf of California, differential amplitude spectra and other aspects of the problem has been published by Knopoff and Pilant in *Geofísica Internacional*, in January 1966. The Institute of Geophysics of the N.A.U.M. provided diverse facilities and one observer, Mr. Roberto Domínguez, a physicist who after the termination of the program spent one year at Los Angeles, in processing data resulting from this experiment which had only been preceded by a preliminary one in the Mediterranean Sea under the direction of Prof. Knopoff, in the summer of 1961.

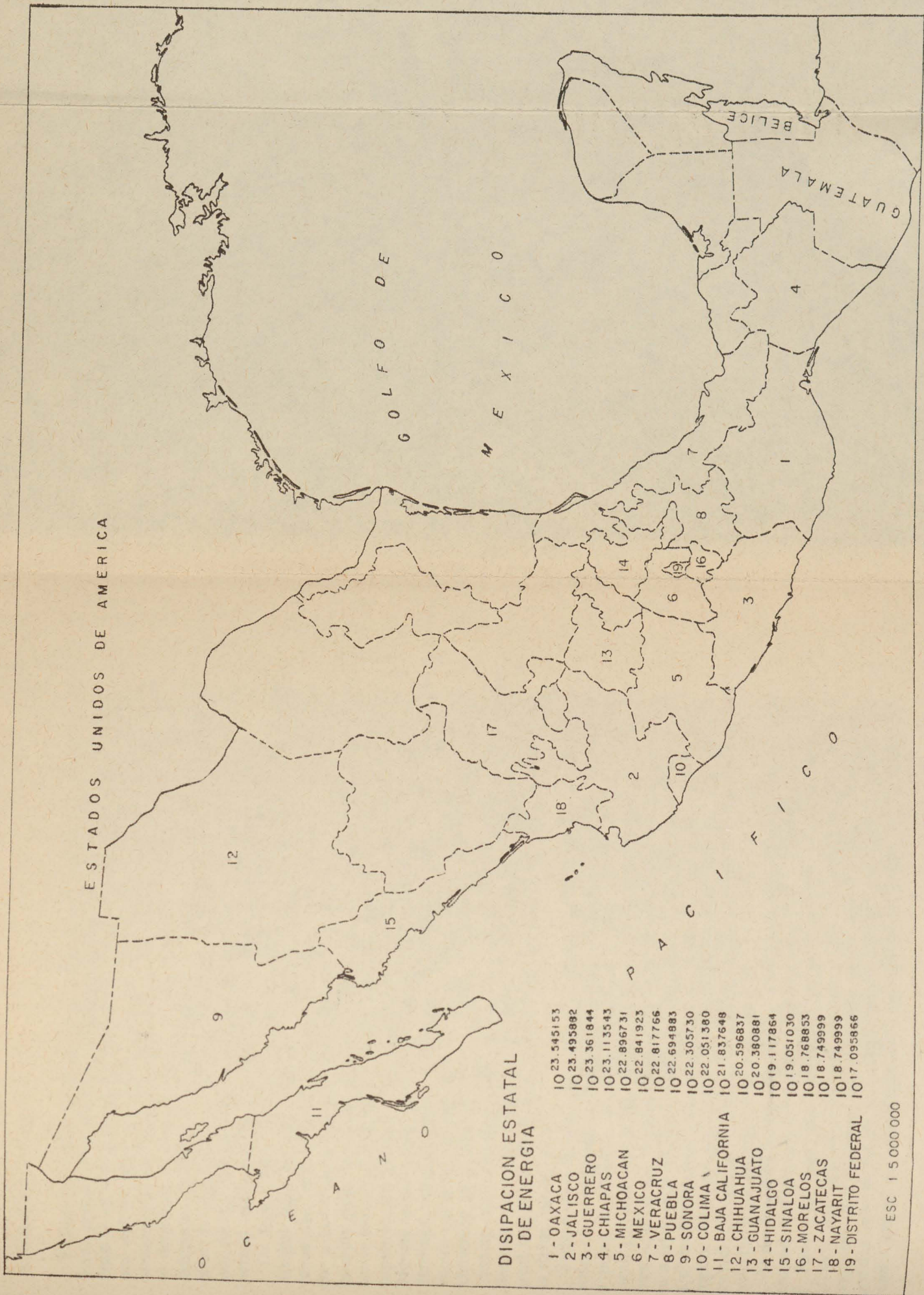
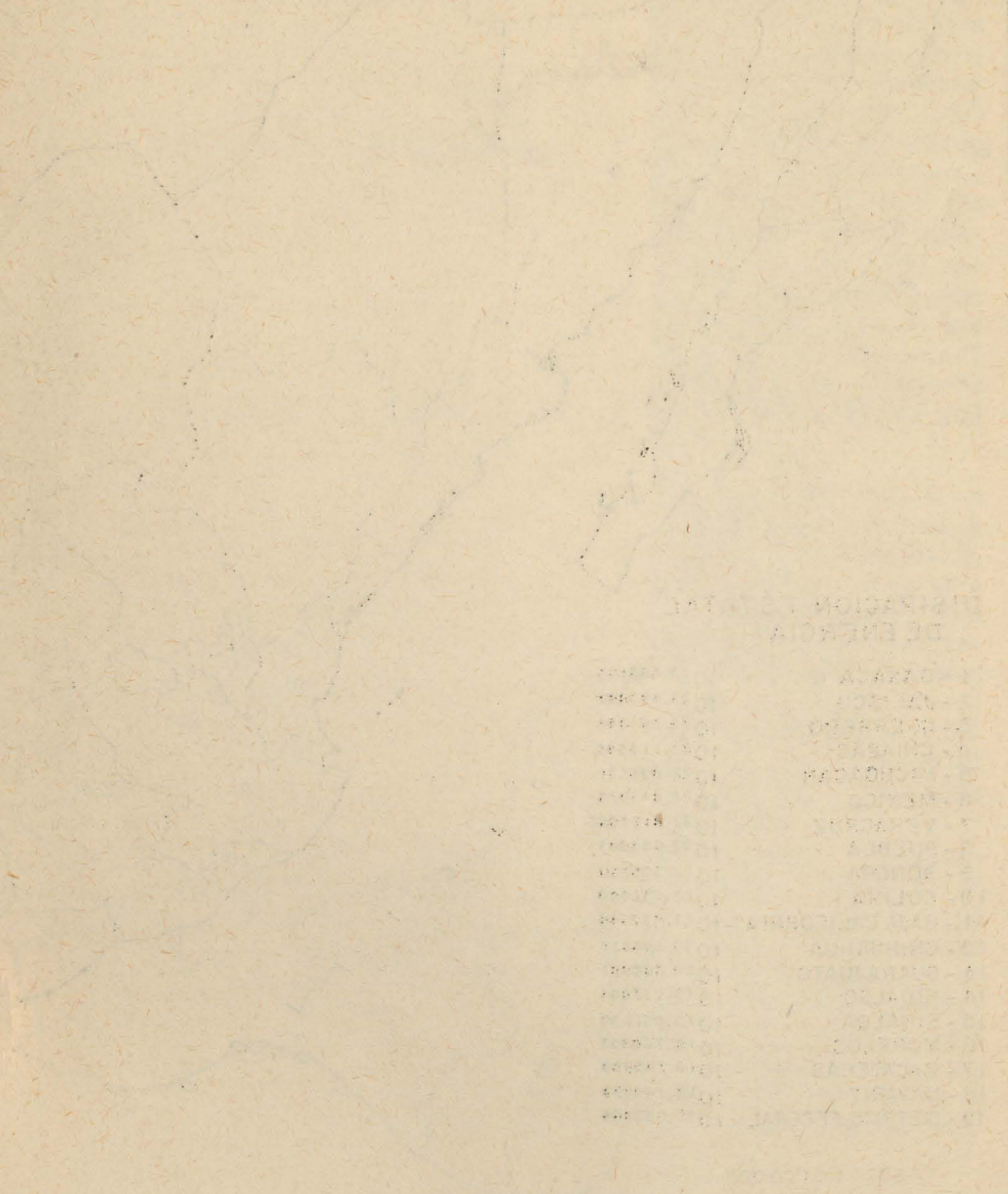


Fig. 9. Dissipation of seismic energy in Mexico.



LEGENDA

1	Capital
2	County Seats
3	Major Cities
4	Other Cities
5	County Boundaries
6	State Boundaries
7	Water Bodies
8	Railroads
9	Highways
10	Other Features

THEORETICAL WORK IN SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR. Some problems of theoretical seismology have been approached in recent years by members of the staff of the Institute of Geophysics, mostly concerned with the analysis of earthquake mechanism, wave propagation and transmission, physical characteristics of media, response spectra, use of S waves to determine direction of motion along fault planes, statistical methods to determine direction of slipmotion, etc. These contributions represent an effort to apply mathematical procedures to the solution of such problems, and for the construction of geophysical models to be tested against sets of natural conditions, or as an explanation of their modes of action.

Dr. Ismael Herrera, Director of the Institute of Geophysics, based on the integral representation theorems for elastodynamics, has used a new and remarkable method to obtain the surface wave terms of the Green's function for a two-dimensional multi-layered half space, by generalizing the orthogonality properties of surface waves when not only Love waves but Rayleigh waves are included. Elastic wave propagation has also been studied in several papers by Dr. Herrera. Using a perturbation method in the first paper, Dr. Herrera carried out his study by means of the integral representation of elastodynamics, which permits to express solutions to problems as integrals of known quantities; in the second (written in company with A.K. Mal, of the University of California, Los Angeles), within nonparallel boundaries by treating small inhomogeneities; and in the third, by developing a first order theory to treat the scattering of elastic waves in thin inhomogeneities (of great importance for certain geological formations satisfying these conditions as dykes, lenses, etc.).

Surface wave transmission was also studied by Dr. Herrera in the same series of contributions by introducing the notion of surface wave content at a point, to obtain a one-dimensional transmission model of scattering by small perturbations in the elastic medium. Both authors (Herrera and Mal) have applied the same technique to study the propagation of Love waves in a layer of nonuniform thickness, lying over a half-space assumed to have a plane free surface while the interface protrudes into it in a certain finite region. After suitable interpretation of results, the theory was extended to include the case in which the area of the perturbed region is large, although only the scalar problem was considered.

At the Third World Conference for Earthquake Engineering, held in New Zealand, in February 1965, Drs. I. Herrera and E. Rosenblueth and Ing. O. P. Rascón discussed the earthquake spectrum prediction for the Valley of Mexico, reporting on field and laboratory tests to determine the dynamic properties of underlying clay; data were used in conjunction with the linear, one-dimensional theory of multiple wave reflection in stratified media and results treated in accordance with an approximate theory which permits

computing the probability of spectral responses for various degrees of damping, to be compared with spectra obtained from earthquake records while missing information for deep strata is found by trial and error and velocities measured for the upper layers adjusted on reasonable bases. In the same occasion, Drs. Herrera and Rosenblueth discussed the response spectra on stratified soil representing viscously damped single-degree systems resting on stratified media. Since the soil is assumed to rest on a viscoelastic homogeneous half space of rock, motion arriving at the rock-soil interface is idealized as a stationary Gaussian process, and the transfer function for the soil formation treated independently for each frequency of interest through use of a matrix formulation.

Prof. Sergio Ferrás, of the Institute of Geophysics, has recently been giving attention to the study of earthquake mechanism by S waves by means of determinants through a direct computational technique, representing an analytical modification of Adams technique, to determine the direction of motion along the fault plane. The mathematical procedure involves the derivation of equations for computing the direction cosine of the "direction of motion" for a type I source, i.e., a couple of two equal and opposite forces with moment at the focus of the earthquake. In another paper on the same problem, Prof. Ferrás has applied the geometric relation indicated by Scheidgger with respect to the convergence of all tangential component vectors on two points defined as the pole and the antipole of the movement. In practice, the projections of circles do not pass through a point, but form a small triangle, whose centre may be considered the pole and the antipole of the movement.

Prof. Ferrás is also attempting to predict earthquake activity in the area of Mexico City on basis of stochastic models to infer properties of natural seismic courses, which in that area have been studied by means of the Poisson and the Yule-Furry methods; this study indicates that: 1) No relation exists between magnitude of any earthquake and that of preceding shocks, 2) Earthquakes do not occur at random and independently of each other in time, and 3) Probably the Yule-Furry method fits satisfactorily into the seismic process, although more research is needed. These papers will soon be published in the pages of the *Bulletin of the Sismological Society of America*, the *Journal of Geophysical Research* and *Geofisica Internacional*.

INSTITUTE OF ENGINEERING

One of its programs refers to the study of macroseisms and their effects on the structural behavior of constructions during (and after) shocks, to derive indications for their legal control. Among other regulations, builders must now install adequate equipment (accelerographs and seismocopes), and this has been done as follows.

Place	Accelerographs		Seismoscopes		
El Infiernillo, Mich.	5	12	of	4	components
La Soledad, Ver.	3	5	"	"	"
Santa Rosa, Jal.	3	5	"	"	"
El Novillo, Son.	3	5	"	"	"
Malpaso, Chis.	3	8	"	"	"
La Angostura, Chis.	3	8	"	"	"
La Villita, Mich.	1	3	"	"	"
México, D. F.	5				
Acapulco, Gro.	1	16	"	"	"
Minatitlán, Ver. *	2				
Acapulco, Gro. *	1				

* to be soon installed.

All major hotels to be constructed in the Mexican territory in view of coming events (World Petroleum Congress, public and private, international meetings, Olympic Games, etc.), will also be required to install accelerographs and seismoscopes under the control of the Institute of Engineering.

Among other characteristics of major earthquakes of interest for these studies, mention should be made of correction of accelerograph programs in four intense shocks, overturning moments and seismic shear forces, earthquake spectrum prediction, and seismic measurements and calculations, all for the Mexico City area. Earthquakes and their effects have also been analyzed for some areas in the Republics of El Salvador and Chile as well as in Acapulco, Gro., in the Mexican Republic. These activities have propitiated the creation of the Mexican Society of Earthquake Engineering, a civil association that exists and works under the auspices of the Institute of Engineering, and which has created in its turn two important journals as indicated in the bibliographic citations.

SEISMIC PROSPECTION FOR OIL AND GAS

For a number of years, the Division of Exploration of *Petróleos Mexicanos*, the Mexican Government oil company, has been actively engaged in a

varied geophysical program for oil and gas exploration, of which the largest part is seismologic (refraction and reflection). This is definitely not a new activity in our country, since seismic reconnaissance work by the refraction method was done in the Golden Lane area in 1922, and later on across the Laguna de Tamiahua, on the Gulf of Mexico coast in the State of Veracruz. A good account of these early stages of geophysical prospecting in Mexico has been given by S. Figueroa (at present Chief of Exploration of Pe-Mex), mentioning places, names, methods and results of high historical and technical interest, and giving indications for present and future operations on land and under sea-water.

In this respect it must be said that almost 30 seismic field parties (mainly for refraction work although reflection is also done), are constantly maintained in activity, together with office personnel in the various branches throughout the country. Among recently surveyed areas mention should be made of the Peninsula of Yucatán, following a geologic prospecting (combined with gravimetric work) as well as in the Laguna de Tamiahua that led to the discovery of a rich oil reservoir under sea-water, now producing several thousand barrels a day. In the same article by Figueroa, a description is given of the successive stages of the geophysical exploration of that area, including details on characteristics of the reservoir and its relationships with the Golden Lane structure on land.

Theoretical analysis of seismic problems is also made by Pe-Mex specialists, most of whom publish their contributions in the *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, a professional society gathering geophysicists working in various applied disciplines. Many problems have been dealt with, like elimination of parasitic noise in seismograms, statistical correlation, optimal cover for seismodetectors, application of Fourier formulae to the study of seismic equipment, etc. During the 1964-1966 lapse covered by this report, increasing attention has been given to theoretical and practical problems linked to submarine exploration.

BIBLIOGRAPHY

- BASURTO GARCÍA, J. 1964. Uso de Detectores Múltiples en la Exploración Sismológica. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*. v (3): 155-186, 17 figs.
- BINDER, R. W. 1964. El Gran Temblor de Alaska de Marzo 27 de 1964. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*. II (2): 45-46.
- BUSTAMANTE, J. I. 1965. Comportamiento Dinámico de Modelos de Terraplenes no Cohesivos. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*. III (1): 27-41, 11 figs.

- BUSTAMANTE, J. I. & J. PRINCE. 1963. Corrección de los Acelerogramas de Cuatro Macrosismos registrados en la Ciudad de México. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*. I (2): 61-83, 2 photos, 19 figs. 2 tables.
- BUSTAMANTE, J. I. & L. RAPOPORT. 1964. Momento de Volteo y Fuerzas Cortantes Sísmicas. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*. II (2): 19-30, 14 figs.
- COFFIN OTERO, J. & M. SALMON H. 1964. Comparación entre Trabajos Sismológicos Antiguos y Recientes en el Distrito Noreste. Afinamiento de las Interpretaciones por el Uso de Técnicas más Perfeccionado y la Coordinación de Datos Sismológicos y Geológicos. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*. V (4): 241-261, 13 figs.
- COFFIN OTERO, J. & J. M. SARABIA. 1966. Método Gráfico para el Cálculo de Tendidos en la Aplicación de Sismos Múltiples y/o Pozos Múltiples en Áreas Difíciles. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*. VII (2): 99-124, 9 graphs., 1 map.
- DEL VALLE C., E. 1964. Cálculo de Modos Naturales de Vibración de Edificios con Marcos y Elementos Rigidizantes. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*. II (1): 29-37, 4 figs., 1 table.
- DIEZ DE COSSIO, R. 1964. El Macrosismo de Jáltipan.—3. Comportamiento de las Estructuras. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*. II (1): 23-28, 27 figs.
- DOBRIN, M. B., A. L. INCALLS & J. A. LONG. 1966. Filtrado de Velocidad y Frecuencia de Datos Sísmicos usando Luz Laser. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*. VII (3): 131-201, 43 figs.
- EGUIA H., A. 1964. Correlación Sismológica y Geológica. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*. V (3): 187-203, 11 figs.
- ELORDUY TÉLLEZ, E. 1966. Método Duyel para Migración Continua, con Tendidos y Distribución de Velocidades del Subsuelo, Variables. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*. VII (4): 223-244, 10 figs., 6 photos.
- ESTEVA, L. 1963a. Estimación de Daños Probables Producidos por Temblores en Edificios. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*. I (1): 9-30, 2 figs., 11 tables.
- ESTEVA, L. 1963b. Regionalización Sísmica de la República Mexicana. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*, I (1): 31-35, 4 figs.
- ESTEVA, L. 1963c. Los Temblores de Mayo de 1962 en Acapulco. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*, I (2): 39-60, 46 figs.
- ESTEVA, L. 1963d. Primeras Jornadas Chilenas de Sismología e Ingeniería Antisísmica, *Revista de la Sociedad Mexicana de Ingeniería Sísmica*. I (2): 76-77.

- ESTEVA, L. 1964. Análisis Elástico de Edificios Altos con Muros Esbeltos. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*, II (2): 47-54, 8 figs.
- ESTEVA, L. & E. ROSENBLUETH. 1964. Espectro de Temblores a Distancias Moderadas y Grandes. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, II (1): 1-18, 6 figs.
- FERRÁES, S. G. 1962a. A Statistical Method to determine the Final Direction of the Slip-Motion in Earthquake Mechanism (in English and Spanish). *Geofísica Internacional*, 2 (4): 93-102, 3 figs., 3 tables.
- FERRÁES, S. G. 1962b. Note on the Determination of the Earthquake Mechanism by S. Wave *Bulletin of the Seismological Society of America*, 52 (2): 683-688.
- FERRÁES, S. G. 1963. A Method to Investigate Earthquake Mechanism Using S Wave Data. *Anales del Instituto de Geofísica, U.N.A.M.*, IX: 33-44, 4 figs.
- FIGUEROA A., J. 1963. Características de Cuatro Macrosismos Mexicanos. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*, I (2): 61-75, 5 figs, 5 tables, 1 list of shocks.
- FIGUEROA A., J. 1964a. Determinación de las Constantes de la Arcilla del Valle de México por Prospección Sísmica. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, II (2): 57-66, 9 figs, 5 tables.
- FIGUEROA A., J. 1964b. Macrosismo del 6 de Julio de 1964. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*, II (2): 39-44, 3 tables.
- FIGUEROA A., J. 1964d. El Macrosismo de Jáltipan. 1. Sismología. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*, II (1): 1-6, 2 figs., 4 tables.
- FIGUEROA, S. 1964. Descubrimiento del Tercer Tramo del Arrecife de la "Faja de Oro" dentro del Golfo de México. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, V (1): 1-22, 16 figs.
- GARCÍA ROJAS, A. & D. GUTIÉRREZ G. 1964. La Transformada de Fourier y su Aplicación en el Estudio de Equipos Sismológicos. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, V (4): 209-245, 20 figs.
- GARCÍA ROJAS, A. 1965. El Teorema de la Superposición y el Filtrado en el Dominio del Tiempo. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, VI (2): 113-139, 11 figs, 1 table.
- GORODETZKY, M. & N. PAULETTO. 1966. Sismograma Sintético del Pozo Longa Nº 1, *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, VIII (2): 69-97, 13 figs., 3 tables.
- GUTIÉRREZ G., D. 1964. Características Teóricas de Algunos Tipos de Ruido y Métodos para su Reconocimiento y Eliminación. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, V (1): 23-80, 37 figs.

- HERMONT, A. J. 1965. Principios Teórico-Básicos de Modernos Sistemas de Control Automático para Equipos Sísmicos. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, vi (2): 145-210, 14 figs.
- HERNÁNDEZ MOEDANO, M. 1964. Determinaciones de la Cubierta Optima de Sismo detectores Múltiples. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, v (2): 143-150, 1 table.
- HERRERA, I. 1964a. On a Method to obtain a Green's Function for a Multi-Layered Half Space. *Bulletin of the Seismologic Society of America*, 54 (4): 1087-1096.
- HERRERA, I. 1964b. A Perturbation Method for Elastic Wave Propagation, I — Nonparallel Boundaries. *Journal of Geophysical Research*, 69 (18): 3845-3851, 2 figs.
- HERRERA, I. 1964c. Contribution to the Linearized Theory of Surface Wave Transmission. *Journal of Geophysical Research*, 69 (22): 4791-4800, 1 fig.
- HERRERA, I. 1965. A Perturbation Method for Elastic Wave Propagation, III — Thin Inhomogeneities (in English and Spanish). *Geofísica Internacional*, 5 (1): 1-14, 3 figs.
- HERRERA, I. 1965. Modelos Dinámicos para Materiales y Estructuras del Tipo Masing. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, III (1): 1-8, 7 figs.
- HERRERA, I. & A. K. MAL. 1965. A Perturbation Method for Elastic Wave Propagation, II — Small Inhomogeneities. *Journal of Geophysical Research*, 70 (4): 871-833, 12 figs.
- KNOPOFF, L. & W. L. PILANT. 1966. A Proposal for a Seismological Study of the Gulf of California (in English and Spanish). *Geofísica Internacional*, 6 (1): 1-21, 17 figs.
- LIMÓN, A. C. 1965. Normas de Operación para Trabajos Sísmicos Marinos. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, vi (4): 239-258, 11 figs. 7 photos.
- MAL, A. K. & I. HERRERA. 1965. Scattering of Love Waves by a Constriction in the Crust. *Journal of Geophysical Research*, 70 (20): 5125-5133, 5 figs.
- MARTÍNEZ MÁRQUEZ, A. 1963. Análisis de Marcos mediante Distribución de Deformaciones. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, I (1): 21-36, 12 figs.
- MAYNE, W. H. 1966. Punto de Reflexión Común. Técnica de Apilar Datos Horizontales (*Data Stacking*). *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, VII (4): 205-221, 10 figs.

- MERINO Y CORONADO, J. 1963a. Notas sobre Algunas Observaciones Sismotectónicas en la República Mexicana. *Anales del Instituto de Geofísica, U.N.A.M.*, 9: 11-32, 3 maps.
- MERINO Y CORONADO, J. 1963b. Notas sobre la Sismicidad de las Costas Mexicanas. *Boletín de la Asociación Mexicana de Geólogos Petroleros*, xv (10): 215-222, 4 figs.
- MERINO Y CORONADO, J. 1966. A Vertical Seismometer with Magnetic Suspension. (in English and Spanish). *Geofísica Internacional*, 6 (1): 33-35, 5 figs.
- NIETO, J. A. & D. RESÉNDIZ. 1965. Interacción Dinámica entre Subsuelo y Estructura: Una Revisión del Problema. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, III (2): 43-64, 34 figs.
- NIETO, J. A., E. ROSENBLUETH & O. A. RASCÓN. 1965. Modelo Matemático para Representar la Interacción Dinámica de Suelo y Cimentación. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, VI ():
- OROZCO JIMÉNEZ, J. L. 1964. Correlación Estadística (Aplicada a la Interpretación Sismológica). *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, v (2): 97-141, 21 figs.
- PÉREZ RUIZ, G. & E. ELORDUY TÉLLEZ. 1965. Cálculo Matemático de Leyes de Velocidad, Método Sigma (Σ). *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, VI (1): 3-52, 15 graphs, 1 table, 1 fig.
- PRINCE J. 1963. Espectros de Temblores y su Aplicación. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*, I (1): 1-8, 10 figs.
- RASCÓN, O. A. 1964. Estudios encaminados a la Predicción de Espectros de Temblores en el Valle de México. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, II (2): 39-56, 1 photo, 2 tables, 10 figs.
- RASCÓN, O. A., E. ROSENBLUETH & L. ESTEVA. 1964. Respuesta Transitoria de Estructuras Elásticas a Perturbaciones fuera de Fase. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, II (1): 32-38, 9 figs.
- RESÉNDIZ, D. 1964. El Macrosismo de Jáltipan — 2. Suelos. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*. II (1): 6-23, 18 figs.
- ROBINSON, E. A. & S. TREITEL. 1965. Principio de Filtrado Digital. *Boletín de la Asociación Mexicana de Geofísicos de Exploración*, VI (2): 81-112, 12 figs.
- ROSENBLUETH, E. 1964. El Macrosismo de Jáltipan — Introducción. *Revista de la Sociedad Mexicana de Ingeniería Sísmica*, II (1): 1.
- ROSENBLUETH, E. 1965. Diseño Sísmico Probabilístico. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, III (1): 9-26, 7 figs.

ROSENBLUETH, E. & R. VALDES. 1963. Sobre la Sismicidad de la Tierra. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, 1 (1): 17-20, 1 table.

ZEEVAERT, L. 1963. Mediciones y Cálculos Sísmicos durante los Temblores Registrados en la Ciudad de México en Mayo de 1962. *Boletín de la Sociedad Mexicana de Ingeniería Sísmica*, 1 (1): 1-16, 5 photos, 8 graphs, 2 tables.