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## PROGRAMME

### Friday 22nd August

- 9:00-12:00 hours  
1st meeting of the Executive Committee of the International Society. Auditorium No. 3, Building "A", Unidad de Congresos.
- 14:00-17:00 hours  
2nd meeting of the Executive Committee. Auditorium No. 3.

### Saturday 23rd August

- 9:00-12:00 hours  
3rd meeting of the Executive Committee. Auditorium No. 3.
- 14:00-17:00 hours  
4th meeting of the Executive Committee. Auditorium No. 3.
- 19:30 hours  
Dinner for members of the Executive Committee and their wives.

### Sunday 24th August

- 10:00-17:00 hours  
Delivery of documents and tickets to Conference members and registration, at María Isabel and Del Prado hotels.

### Monday 25th August

- 9:00-17:00 hours  
Delivery of documents and tickets and registration at the entrance hall, Building "A", Unidad de Congresos (except during Inaugural Session).
- 10:00-18:00 hours  
Exhibition of equipment. Ground floor, Building "A" (closed during Inaugural Session)
- 10:30-12:00 hours  
Inaugural Session. Auditorium No. 1, Building "A"
- 12:00-14:15 hours  
Welcome reception and buffet. Gardens of the Unidad de Congresos

### Vendredi 22 Août

- 9 h-12 h  
1<sup>ère</sup> Réunion du Comité Directeur de la Société Internationale. Auditorium No. 3. Bâtiment "A" de la "Unidad de Congresos".
- 14 h-17 h  
2<sup>ème</sup> Réunion du Comité Directeur. Auditorium No. 3

### Samedi 23 Août

- 9 h-12 h  
3<sup>ème</sup> Réunion du Comité Directeur. Auditorium No. 3
- 14 h-17 h  
4<sup>ème</sup> Réunion du Comité Directeur. Auditorium No. 3
- 19 h 30  
Dîner pour les membres du Comité Directeur et leurs épouses.

### Dimanche 24 Août

- 10 h-17 h  
Remise des documents et des billets aux Congressistes. Inscription à l'hôtel María Isabel et à l'hôtel Del Prado.

### Lundi 25 Août

- 9 h-17 h  
Remise des documents et des billets. Inscription des Congressistes dans le hall du Bâtiment "A" de la "Unidad de Congresos". (Interruption durant la séance d'ouverture).
- 10 h-18 h  
Exposition d'équipement. Rez-de-chaussée du Bâtiment "A"
- 10 h 30-12 h  
Séance d'inauguration du Congrès. Auditorium No. 1 du Bâtiment "A"
- 12 h-14 h 15  
Réception et buffet dans les jardins de la "Unidad de Congresos"

14:30-17:30 hours

Main Session No. 1 (Auditorium No. 1):  
Stress-Deformation and Strenght Characteristics, Including Time Effects

Chairman: J.G.Zeitlen (Israel)  
General Reporter: Ronald F.Scott (USA)  
Associate Reporter: Hon-Yim Ko (U.S.A.)  
Panel Members: J.Biarez (France)  
R.E.Gibson (England)  
T.Kenney (Canada)  
J.K.Mitchell (U.S.A.)  
T.Mogami (Japan)

Topics proposed by the General Reporter  
a) Considerations of continuum mechanics  
b) Statistical approaches; granular models  
c) Plasticity, yield surfaces, strenght  
d) Rate processes  
e) Testing procedures

Tuesday 26th August

9:30-12:30 hours

Main Session No.2 (Auditorium No.1):  
Foundations of Buildings in Clay

Chairman: N.A.Tsytoovich (U.S.S.R.)  
General Reporter: Victor F.B. de Mello (Brazil)

Panel Members: H.Q.Golder (Canada)  
A.Kézdi (Hungary)  
D.Mohan (India)  
G.Pérez Guerra (Venezuela)  
E.Rosenblueth (México)

Topics proposed by the General Reporter:

- a) Ultimate bearing capacities and allowable pressures on clays
- b) Settlement computations compared with observations and damage records
- c) Behavior of piers and piles in clayey soils, including individual vs. group response and execution effects
- d) Negative skin friction
- e) The process of design; confidence levels in the evaluation of soil properties and their effect on design decisions.

10:00-18:00 hours

Exhibition of equipment.

14:30-17:30 hours

Specialty Sessions Nos.2,3,7,14,16 and 18

14 h 30-17 h 30

Séance Pléniere No. 1. (Auditorium No. 1):  
Caracteristiques Contraintes Deformations et Resistance, Compte Tenu De L'Influence Du Temps

Presidente: J.G.Zeitlen (Israel)  
Rapporteur Général: Ronald F.Scott (U.S.A.)  
Rapporteur Adjoint: Hon-Yim Ko (U.S.A.)

Comité de Discussion:

J.Biarez (France)  
R.E.Gibson (Grande Bretagne)  
J.Kenney (Canada)  
J.K.Mitchell (U.S.A.)  
T.Mogami (Japón)

Sujets proposés par le Rapporteur Général:

- a) Considérations de mécanique des milieux continus
- b) Approches statistiques; modèles granulaires
- c) Plasticité, surfaces limites; résistance
- d) Processus de fluage (rate processes)
- e) Techniques d'essai.

Mardi 26 Août

9 h 30-12 h 30

Séance Pléniere No.2. (Auditorium No.1)  
Fondations de Structures Sur Argiles

Président: N.A.Tsytoovich (U.R.S.S.)  
Rapporteur Général: Victor F.B.de Mello (Brésil)

Comité de Discussion:

H.Q.Golder (Canada)  
A.Kézdi (Hongrie)  
D.Mohan (Inde)  
G.Pérez Guerra (Venezuela)  
E.Rosenblueth (Mexique)

Sujets proposés par le Rapporteur Général:

- a) Force portante à la rupture et pressions admissibles dans les argiles purement cohérentes
- b) Comparaisons entre tassements calculés et observés, désordres provoqués, particulièrement dans des argiles préconsolidées ou spéciales
- c) Comportement des pieux et puits en terrains argileux, différences entre pieux isolés et groupes de pieux et effets de l'exécution
- d) Frottement négatif
- e) Projets. Niveaux de confiabilité dans l'évaluation des propriétés des sols et leur incidence sur l'établissement des projets.

10 h-18 h

Exposition d'Equipement. Rez de Chaussée, Bâtiment "A"

14 h 30-17 h 30

Séances Spéciales Nos.2,3,7,14,16 et 18

Session	Title	Auditorium	Séance	Thème	Auditorium
2	Soil Dynamics (1)	A-5	2	Dynamique des Sols (1)	A-5
3	Expansive Soils and Moisture Movements in Partly Saturated Soils	B-7	3	Sols Expansifs et Mouvement de l'humidité dans le Sols Partiellement Saturés	B-7
7	Structural and Physico-Chemical Effects on the Properties of Clays	A-4	7	Influence de la Physico-Chimie des Argiles sur leurs Propriétés	A-4
14	Cast-in-Situ Diaphragm Walls	A-3	14	Les Parois Moulées dans le Sol	A-3
16	New Laboratory Methods of Investigating Soil Behaviour	B-9	16	Nouvelles Méthodes de Laboratoire pour l'Analyse du Comportement des Sols	B-9
18	Roads and Runways (1)	A-2	18	Routes et Pistes d'Aéroport (1)	A-2
14:30-17:30 hours Technical Visits Nos.1,2,3 and 4			14 h 30-17 h 30 Visites techniques Nos.1,2,3 et 4		
14:00 hours Exhibition of technical films. Auditorium No.1.			14 h Présentation de films techniques: Auditorium No. 1		
Wednesday 27th August			Mercredi 27 Août		
9:30-12:30 hours Main Session No.3. (Auditorium No.1): Earth and Rockfill Dams			9 h 30-12 h 30 Séance Plénière No.3. (Auditorium No.1) Barrages en Terre et en Enrochement		
Chairman: A.Mayer (France) General Reporter: Stanley D. Wilson (U.S.A.) Associate Reporter: R.Squier (U.S.A.) Panel Members: A.Casagrande (U.S.A.) R.J.Marsal (Mexique) A.A.Nitchiporovitch (U.S.S.R.) I.L.Pinkerton (Australia) P.Sembenelli (Italy)			Président: A.Mayer (France) Rapporteur Général: Stanley D. Wilson (U.S.A.) Rapporteur Adjoint: R. Squier (U.S.A.) Comité de Discussion: A.Casagrande (U.S.A.) R.J. Marsal (Mexique) A.Nitchiporovitch (U.R.S.S.) I.L.Pinkerton (Australie) P.Sembenelli (Italie)		
Topics proposed by the General Reporter:			Sujets proposés par le Rapporteur Général:		
a) Interaction, including load transfer and strain, between component materials of a dam, including the foundation			a) Interactions, y compris les transferts de charges et déformations, entre les matériaux composant un barrage, fondations comprises		
b) Stability analyses - criteria, side restraint, plane strain, meaning of factor of safety			b) Critères d'analyse de stabilité; déformation plane; restriction latérale; signification du coefficient de sécurité		
c) Performance of dams with special problems or of unique design			c) Comportement de barrages présentant des problèmes spéciaux ou de conception nouvelle		
d) Treatment of pervious foundations of great depth			d) Traitement de fondations perméables à grande profondeur		
e) Specifications and control for processing and placement of materials.			e) Spécifications et contrôle du traitement et de la mise en place des matériaux.		
10:00-18:00 hours Exhibition of equipment. Ground Floor, Building "A"			10 h-18 h Exposition d'Équipement. Rez de Chaussée, Bâtiment "A"		
14:30-17:30 hours Specialty Sessions Nos. 2,4,13,15 and 18			14 h 30-17 h 30 Séances Spéciales Nos. 2,4,13,15 et 18		



Session	Title	Auditorium	Séance	Thème	Auditorium
2	Soil Dynamics(2)	A-5	2	Dynamique des Sols(2)	A-5
4	Pore Pressure Measurements in the Field and in the Laboratory	B-7	4	Mesure de la Pression Interstitielle In situ et en Laboratoire	B-7
13	Mechanical Properties of Rockfill and Gravel Materials (1)	A-4	13	Propriétés Mécaniques des Enrochements et Graviers	A-4
15	Anchorage, Especially in Soft Ground	A-3	15	Les Ancrages, Notamment en Terrains Meubles	A-3
18	Roads and Runways(2)	A-2	18	Routes et Pistes d'Aéroport (2)	A-2
14:30-17:30 hours Technical Visits Nos.1,2,3 and 4			14 h 30-17 h 30 Visites techniques No.1,2,3 et 4		
14:00 hours Exhibition of technical films. Auditorium No. 1.			14 h Présentation de films techniques. Auditorium No. 1		
Thursday 28th August			Jeudi 28 Aout		
9:30-12:30 hours Main Session No.4 (Auditorium No.1): Deep Excavations and Tunneling in Soft Ground			9 h 30-12 h 30 Séance Plénière No.4. (Auditorium No. 1) Excavations Profondes et Construction de Tunnels en Terrains de Faible Resistance		
Chairman: O.Moretto (Argentina) General Reporter: Ralph B.Peck (U.S.A.)			Président: O Moretto (Argentine) Rapporteur Général: Ralph B.Peck(U.S.A.)		
Panel Members: J.Alberro (México) M.Endo (Japan) J.E.Jennings (South Africa) T.Kuesel (U.S.A.) W.H. Ward (England)			Comité de Discussion: J.Alberro (Mexique) M.Endo (Japón) J.E.Jennings (Afrique du Sud) T.Kuesel (U.S.A.) W.H.Ward (Grande Bretagne)		
Topics proposed by the General Reporter:			Sujets proposés par le Rapporteur Général:		
a) Stability conditions at bottom of deep cuts			a) Conditions de stabilité du fond des excavations profondes		
b) Measured and calculated pressures and deformations associated with deep cuts in c materials			b) Pressions et déformations calculées et mesurées dans des excavations profondes en milieux c-		
c) Conditions for use of digger-shields in soft-ground tunnelling			c) Conditions d'emploi de boucliers d'excavation pour la construction de tunnels en terrains de faible résistance		
d) Measured and calculated ground movements around soft-ground tunnels and loads in supports, as influenced by construction procedures.			d) Mouvements observés et calculés autour des tunnels en terrains de faible résistance et charges transmises aux étais; influence des procédés de construction.		
10:00-18:00 hours Exhibition of equipment. Ground Floor, Building "A"			10 h-18 h Exposition d'Equipement. Rez de Chaussée, Bâtiment "A"		
14:30-17:30 hours Specialty Sessions Nos.5,6,8,10,12 and 13			14 h 30-17 h 30 Séances Spéciales Nos.5,6,8,10,12 et 13		

Session	Title	Auditorium	Séance	Theme	Auditorium
5	Engineering Properties of Loess and other Collapsible Soils	B-7	5	Propriétés Mécaniques et Physiques du Loess et Autres Sols Susceptibles de Rupture Brusque	B-7

6	Engineering Properties of Lateritic Soils(1)	A-3	6	Propriétés Mécaniques et Physiques des Latérites (1)	A-3
8	Negative Skin Friction and Settlements of Piled Foundations	A-2	8	Frottement Négatif et Tassement des Fondations sur Pieux	A-2
10	Engineering Properties and Behavior of Clay-Shales	A-5	10	Propriétés Mécaniques et Physiques et Comportement des Argiles Feuilletées	A-5
12	Advances in Consolidation Theories for Clays	A-6	12	Progres Récents des Théories sur la Consolidation des Argiles	A-6
13	Mechanical Properties of Rockfill and Gravel Materials (2)	A-4	13	Propriétés Mécaniques des Enrochements et Graviers (2)	A-4
14:30-17:30 hours			14 h 30-17 h		
Technical Visits Nos.1,2,3 and 4			Visites techniques Nos.1,2,3 et 4		
14:00 hours			14 h		
Exhibition of technical films. Auditorium No. 1			Présentation de films techniques. Auditorium No. 1		
20:00-22:30 hours			20 h		
Performance of the Ballet Folklórico de México, Palacio de las Bellas Artes.			Représentation du Ballet Folklórico de México, "Palacio de las Bellas Artes".		

**Friday 29th August**

**Vendredi 29 Aout**

9:30-12:30 hours	Main Session No.5. (Auditorium No.1): Stability of Natural Slopes and Embankment Foundations	9 h 30-12 h 30	Séance Plénière No.5.(Auditorium No.1): Stabilité des Talus Naturels et Des Fondations de Remblais
Chairman: D.H.Trollope (Australia)	General Reporter: A.W.Skempton (England)	Président: D.H.Trollope (Australie)	Rapporteur Général: A.W.Skempton (Grande Bretagne)
Associate Reporter: J.Hutchinson (England)		Rapporteur Adjoint: J.Hutchinson (Grande Bretagne)	
Panel Members: L.Bjerrum (Norway)	H.Borowicka (Austria)	Comité de Discussion:	L.Bjerrum (Norvège)
B.Broms (Sweden)	R.C.Hirschfeld (U.S.A.)	H.Borowicka (Autriche)	B.Broms (Suède)
J.Kenney (Canada)		J.Kenney (Canada)	
Topics proposed by the General Reporter		Sujets proposés par le Rapporteur Général:	
a) Classification of landslides		a) Classification des glissements de terrain	
b) Time effects in failures of i) cuttings ii) natural slopes.		b) Effets du temps sur le glissement des parois d'excavation et de talus	
c) Mechanics of progressive failure		c) Mécanisme de la rupture progressive	
d) Instrumentation of slopes.		d) Instruments et techniques de mesure appliqués aux talus	
e) Observations of creep movements		e) Observations des mouvements dus au fluage	
f) Engineering significance of solifluction and other periglacial effects		f) Importance de la solifluxion et autres phénomènes periglaciaux en génie civil	
g) Remedial measures		g) Mesures à prendre pour la solution des problèmes posés.	
10:00-18:00 hours	Exhibition of equipment. Ground Floor, Building "A"	10 h-18 h	Exposition d'Equipement. Rez de Chaussée Bâtiment "A"
14:30-17:30 hours	Specialty Sessions Nos.1,6,9,11 and 17	14 h 30-17 h 30	Séances Spéciales Nos.1,6,9,11 et 17

Session	Title	Auditorium	Séance	Thème	Auditorium
1	Soil Sampling	A-5	1	Prélèvement d'Echantillons	A-5
6	Engineering Properties of Lateritic Soils(2)	A-3	6	Propriétés Mécaniques et Physiques des Latérites (2)	A-3
9	Safety Factors in Soil Mechanics	A-4	9	Coefficients de Sécurité en Mécanique des Sols	A-4
11	Terminology and Definitions in Soil Mechanics	A-6	11	Terminologie et Définitions en Mécanique des Sols	A-6
17	Field Measurements	A-2	17	Mesures de Chantier	A-2
14:30-17:30 hours Technical Visits Nos.1,2,3 and 4			14 h 30-17 h 30 Visites techniques Nos.1,2,3 et 4		
14:00 hours Exhibition of technical films. Auditorium No. 1			14 h Présentation de films techniques. Auditorium No. 1		
20:00 hours Closing Ceremony and Conference Banquet, Castillo de Chapultepec.			20 h Cérémonie de Clôture du Congrès et dîner d'adieu. "Castillo de Chapultepec".		
Saturday 30th August			Samedi 30 Août		
9:30-17:00 hours Visit to the archeological zone of San Juan Teotihuacán and lunch.			9 h 30-17 h Visite de la zone archéologique de San Juan Teotihuacán et déjeuner sur place		
Sunday 31st August			Dimanche 31 Août		
9:30-12:30 hours Technical Visits for which sufficient requests be received			9 h 30-12 h 30 Visites techniques organisées en fonction des demandes recues		
10:00-17:00 hours Visit to Tepotzotlán and lunch			10 h-17 h Visite de Tepotzotlán et déjeuner sur place		
Departures for tours outside Mexico City			Départ des Voyages organisés hors de México		
LADIES PROGRAM			PROGRAMME POUR LES DAMES		
Monday 25th August			Lundi 25 Août		
10:30-12:00 hours Inaugural Session. Auditorium No. 1, Building "A", Unidad de Congresos.			10 h 30-17 h Cérémonie d'ouverture du Congrès. Auditorium No. 1 Edifice "A" de la Unidad de Congresos.		
12:00-14:15 hours Welcome reception in the gardens of the Unidad de Congresos. Buffet lunch.			12 h-14 h 15 Réception dans les jardins de la "Unidad de Congresos". Buffet		
Afternoon Free.			Après-midi Libre.		
Tuesday 26th August			Mardi 26 Août		
Morning Free			Matinée Libre		
16:00-18:30 hours Tea, Exhibition of regional costumes. Salón de Fiestas, María Isabel Hotel.			16 h-18 h 30 Thé. Présentation de costumes typiques. Salón de Fiestas à l'Hôtel María Isabel		

Wednesday 27th August

- 10:30-15:00 hours  
Group "A", visit to the Museo Nacional de Antropología. Lunch
- 10:00-15:00 hours  
Group "B", visit to various points of interest in the City. Lunch.
- Afternoon Free or Technical Visit No. 3 (See "Technical Visits"). This visit started at the Unidad de Congresos.

Thursday 28th August

- 11:00-13:00 hours  
Visit to the Bazar Sábado
- Afternoon Free
- 20:00-22:30 hours  
Special performance of the Ballet Folklórico de México. Palacio de las Bellas - Artes.

Friday 29th August

- 10:30-15:00 hours  
Group B\*, visit to the Museo Nacional de Antropología. Lunch.
- 10:00-15:00 hours  
Group A\*, visit to various points of interest in the City. Lunch.
- Afternoon Free
- 20:00 hours  
Closing Ceremony and Conference Banquet, Castillo de Chapultepec.

Saturday 30th August

- 9:30-13:00 hours  
Visit to the archeological zone of San Juan Teotihuacán.
- 13:00-15:00 hours  
Lunch in Teotihuacán
- 17:00 hours  
Return of buses to meeting places.

Sunday 31st August

- 10:00-17:00 hours  
Visit to the Convent of Tepotzotlán (Museo del Virreinato). Lunch.

Mercredi 27 Août

- 10 h 30-15 h  
Groupe A\*. Visite du "Museo Nacional de Antropología". Déjeuner.
- 10 h-15 h  
Groupe B\*. Visite de différents centres d'intérêt de la ville
- Après-midi Libre, ou Visite Technique No.3 - (Voir paragraphe: Visites Techniques). Départ de la "Unidad de Congresos".

Jeudi 28 Août

- 11 h-13 h  
Visite du Bazar del Sábado
- Après-midi Libre
- 20 h-22 h 30  
Représentation spéciale du Ballet Folklórico de México. "Palacio de las Bellas - Artes".

Vendredi 29 Août

- 10 h 30-15 h  
Groupe B\*. Visite du "Museo Nacional de Antropología". Déjeuner
- 10 h-15 h  
Groupe A\*. Visite des divers centres d'intérêt de la ville
- Après-midi Libre
- 20 h  
Séance de Clôture et Dîner d'adieu. "Castillo de Chapultepec".

Samedi 30 Août

- 9 h 30-13 h  
Visite de la zone archéologique de Teotihuacán.
- 13 h-15 h  
Repas à Teotihuacán.
- 17 h  
Retour aux points de réunion.

Dimanche 31 Août

- 10 h-17 h  
Visite du Couvent de Tepotzotlán. (Museo del Virreinato). Déjeuner.

\* To facilitate arrangements for two of the visits, the ladies were divided into two groups; Group "A" formed by those ladies staying at the Del Prado hotel and in other hotels close by, and Group "B" by those ladies staying at or in the vicinity of María Isabel hotel.

\* Afin de faciliter le déroulement des visites, les dames ont été réparties en deux groupes; le groupe "A" comprenant les dames logées à l'hôtel Del Prado et dans les environs de ce dernier et le groupe "B" toutes les dames logées à l'hôtel María Isabel et dans ses environs.

MINUTES OF THE EXECUTIVE COMMITTEE MEETINGS  
 PROCES-VERBAL DES REUNIONS DU COMITE EXECUTIF

Membres présents et Pays Représentés	Attendance and Countries Represented	
President/Président	L. Bjerrum	
Past Presidents/Ancien Présidents	A. Casagrande	
	A. W. Skempton	
Vice Presidents/Vice Présidents		
Africa/Afrique	B. A. Kantey	
Asia/Asie	J. G. Zeitlen	
Australasia/Australasie	D. H. Trollope	
Europe	J. Brinch Hansen (†)	
North America/Amérique du Nord	W. J. Turnbull	
South America/Amérique du Sud	O. Moretto	
Argentina/Argentine	F. L. Torres	C. M. Arce
Australia/Australie	E. H. Davis	M. Wood
Austria/Autriche	H. Borowicka	
Belgium/Belgique	E. de Beer	
Brazil/Brésil	M. Vargas	V. de Mello
Bulgaria/Bulgarie	G. Stefanoff	
Canada	C. B. Crawford	S. R. Sinclair
China/Chine		
Colombia/Colombie	R. Cajiao	T. Shuk
Czechoslovakia/Tchécoslovaquie	Z. Bazant	
Denmark/Danemark	J. Hessner	N. Ovesen
Ecuador/Equateur	L. Marín N.	M. Sierra A.
Finland/Finlande	K. V. Helenelund	
France	A. Mayer	J. Kérisel
Germany/Allemagne	H. W. Köening	H. Kuehn
Greece/Grèce	A. Loizos	E. Sotiropoulos
Hungary/Hongrie	A. Kézdi	
India/Inde	D. Mohan	T. Natarajan
Ireland/Irlande		
Israel/Israël	G. Wiseman	E. Zolkov
Italy/Italie	C. Niccolai	G. Baldevin
Japan/Japon	S. Murayama	H. Mori
Mexico/Mexique	L. Flamand	J. Gamboa
Morocco/Maroc	M. Moussaoui	M. Mariotti
Netherlands/Pays-Bas	H. K. S. Begeman	W. H. Loof
New Zealand/Nouvelle Zélande	P. W. Taylor	
Norway/Norvège	N. Janbu	B. Kjaernsli
Peru/Pérou	M. Montero P.	G. Humala A.
Poland/Pologne		
Portugal	U. Nascimento	
Rhodesia/Rhodésie		
Republic of South Africa/ République de l'Afrique du Sud	J. E. Jennings	
Southeast Asia/Asie du Sud-Est	Ching Fung Kee	
Spain/Espagne	V. Escario	J. A. Jiménez Salas
Sweden/Suède	R. Lundström	B. Broms
Switzerland/Suisse	J. C. Ott	E. Recordon
Turkey/Turquie	H. Peynircioglu	E. Togrol
United Kingdom/Royaume-Uni	R. E. Gibson	L. F. Cooling
U. S. A./E. U. A.	R. J. Woodward	J. Hilf
U. S. S. R./U. R. S. S.	N. A. Tsytovich	L. Jürgensen
Venezuela/Vénézuéla	L. García I.	
Yugoslavia/Yougoslavie	I. Sovinc	I. Kleiner

In addition the following were invited to attend the meeting as observers:

The new Vice-Presidents, the Chairman of the official Sub-Committees and the members of the Organizing Committee.

1. The President welcomed each member of the Executive Committee. He then asked all present to stand in memory of three outstanding colleagues who had died since we last met, Jørgen Brinch Hansen, up to his death Vice-President for Europe, Nabor Carrillo who had initiated the Mexico Conference, and Robert Peterson of Canada.

The President then explained how he had appointed Kevin Nash as Secretary to the Society and expressed the hope that with an improved secretariat; the Society would also be made stronger.

Other innovations aimed at doing this were the reductions in the number of conference papers, the introduction of Specialty Sessions and a strengthening of the Executive Committee itself by seeking greater continuity in membership and by meeting more frequently.

2. The minutes of the last meeting held in Montreal, 7-15 Sept., 1965 were signed as a correct record of what took place.

The Secretary stated that he planned to place draft minutes of the current meeting before the Executive Committee for approval, if possible tomorrow afternoon, so that these could be signed before the Committee dispersed. It was also planned that each member should receive a copy in Mexico and that additional copies should be mailed from London to each National Society. This procedure was approved.

3. The Secretary announced that the membership of the Society amounted to 8776 on 1st Jan. 1968 as shown in Appendix A. This is 1076 more than that reported in Montreal.

Since the last meeting two National Societies have been accepted into membership, Greece and S.E. Asia, which includes members in Malaysia, Thailand, Hong-Kong, Singapore and the Philippines.

4. The statement of income and expenditure for the years 1965-1969 given in Appendix B was approved. Concern was expressed at the high cost of the list of Members and the

Ont été invités, en outre, à assister au meeting, à titre d'observateurs:

Les nouveaux Vice-Présidents, les Présidents des Sous-Comités officiels ainsi que les membres du Comité Organisateur.

1. Après avoir souhaité la bienvenue à chacun des membres du Comité Exécutif, le Président a demandé aux assistants d'observer une minute de silence en mémoire de trois collègues éminents, décédés depuis la dernière réunion, à savoir: Jørgen Brinch Hansen, Vice-Président pour l'Europe jusqu'à sa mort, Nabor Carrillo qui est à l'origine du Congrès de Mexico et Robert Peterson, Canada.

Le Président a expliqué ensuite comment il avait désigné Kevin Nash en tant que Secrétaire de la Société et manifesté l'espoir que cette nouvelle nomination renforce cette dernière. Parmi les innovations effectuées dans ce but, le Président a cité la réduction du nombre des communications, l'introduction de séances spéciales, enfin la consolidation du Comité Exécutif lui-même, ceci grâce à une plus grande continuité en ce qui concerne les membres de ce Comité et à des réunions plus fréquentes.

2. Le compte-rendu de la dernière réunion qui a eu lieu à Montréal, du 7 au 15 septembre 1965 a été approuvé comme fidèle registre des actes de cette réunion.

Le Secrétaire a déclaré qu'il avait l'intention de présenter les minutes de cette réunion au Comité Exécutif, pour approbation, si possible demain après-midi, de façon à ce que celles-ci puissent être signées avant que les membres du Comité ne se dispersent. Il a également été prévu que chaque membre en recevrait un exemplaire à Mexico et que des exemplaires supplémentaires seraient envoyés de Londres à chaque société nationale. Cette procédure a été approuvée.

3. Le Secrétaire a annoncé que le nombre des membres de la Société s'élevait à 8776 au 1er Janvier 1968, comme l'indique l'Appendice A. Ceci signifie une augmentation de 1076 par rapport au chiffre indiqué lors de la réunion de Montréal.

Depuis la dernière réunion, deux Sociétés Nationales ont été admises comme membres; il s'agit de la Grèce et de l'Asie du Sud-Est qui groupe des membres de Malaisie, Thaïlande, Hong-Kong, Singapour et des Philippines.

4. L'exposé des entrées et des dépenses pour

Secretary agreed to see if he could find a way of saving money on this item possibly by having it reproduced other than in England.

The Secretary stated that if all National Societies paid their dues promptly each year he anticipated that the current subscription rate would be adequate until 1971, and it was agreed that this should remain at the present figure, \$25 per National Society plus 75c per member.

5. In accordance with the procedure stated in the Statutes amended in Montreal, the following were nominated as Vice Presidents for the period 1969-1973

AFRICA	Mr. M. P. dos Santos	(Portugal)
ASIA	Dr. T. Mogami	(Japan)
AUSTRALASIA	Prof. E. H. Davis	(Australia)
EUROPE	Prof. E. de Beer	(Belgium)
N. AMERICA	Dr. D. H. MacDonald	(Canada)
S. AMERICA	Dr. G. Perez G.	(Venezuela)

These were formally elected with acclamation. It was pointed out that if the new Constitution and By-Laws are accepted, a Vice-President would have to belong truly to the region he represented, and that this would apply from 1973.

6. The President announced that after consultation with the Past Presidents he had invited Prof. Ralph Peck to be the President for the period 1969-1973, and that Prof. Peck had consented. This was also greeted with acclamation.

7. The President outlined the duties of the new post of Secretary General and recommended that Kevin Nash should be invited to serve in this capacity for the period 1969-1973. He pointed out that an annual honorarium of U.S. \$ 4,000 had been paid to Prof. Nash for the services already rendered and it was agreed that this should be continued and be paid out of the Society's funds.

8. The new Constitution and By-Laws which had previously been circulated to National Societies were discussed at length, and after some amendment the versions shown in Appendix C were approved.

9. A lengthy discussion took place as to whether English alone should be the official language of the Society or whether it should remain as at present with English and French. Apart from the French speaking countries

les années 1965-1966, indiquées dans l'Appendice B, a été approuvé. Comme il était question du prix élevé de la Liste des Membres, le Secrétaire a déclaré qu'il allait essayer de trouver un moyen plus économique à ce sujet, probablement en faisant reproduire cette liste dans un autre pays que l'Angleterre.

Le Secrétaire a déclaré que si toutes les Sociétés Nationales payaient leurs droits de souscription rapidement chaque année, le prix actuel de la souscription resterait le même jusqu'en 1971. Le tarif actuel de \$25 par Société Nationale et de 75 c par membre serait donc conservé.

5. Conformément à la procédure établie dans les Statuts modifiés à Montréal, les personnes suivantes ont été nommées Vice-Présidents pour la période 1969-1973.

AFRIQUE	M. M. P. dos Santos	(Portugal)
ASIE	Dr. T. Mogami	(Japon)
AUSTRALASIE	Prof. E. H. Davis	(Australie)
EUROPE	Prof. E. H. de Beer	(Belgique)
AMERIQUE DU NORD	Dr. D. H. MacDonald	(Canada)
AMERIQUE DU SUD	Dr. G. Perez G.	(Venezuela)

L'élection de ces derniers a été chaleureusement applaudie. Il a été souligné que si la nouvelle Constitution et les statuts sont approuvés, chaque Vice-Président devra appartenir à la région qu'il représente. Cette mesure sera alors mise en vigueur à partir de 1973.

6. Le Président a annoncé qu'après avoir consulté à ce sujet les Présidents antérieurs, il avait décidé de proposer à M. le Prof. Ralph Peck le poste de Président pour la période de 1969-1973. Le Prof. Peck a donné son consentement. Cette initiative a également été applaudie.

7. Après avoir insisté sur les devoirs et obligations qu'implique le nouveau poste de Secrétaire Général, le Président a proposé que M. Kevin Nash soit invité à occuper celui-ci pour la période 1969-1973. Il a également indiqué que le montant annuel de 4.000 \$ U.S. avait été versé au Prof. Nash pour les services qu'il avait déjà prêtés. Il a été décidé que ces honoraires continueraient à être versés au Prof. Nash et seraient payés sur les fonds de la Société.

8. La nouvelle constitution et les nouveaux statuts dont le texte a été remis au préalable aux Sociétés Nationales ont été discutés en détail. Après diverses modifications, les versions indiquées dans l'Appendice C ont été approuvées.

many spoke in favour of retaining French and it was evident that this was the general wish of the Society. No vote was taken.

10. Proposals from the Indian National Society that the International Society should increase its activities by

- (i) preparing and issuing reviews of research in progress
- (ii) publishing an International Journal
- (iii) fostering the exchange of research programmes, etc.

were not accepted, but Prof. D. Mohan (India) and Mr. E. Zolkov (Israel) were asked to make more specific proposals on these lines for consideration at the next Executive Committee with cost estimates included. The Secretary General agreed to give what help he could in formulating costs.

11. The President suggested that one method of achieving some of the aims of the Indian proposal would be to ask existing soil mechanics journals to make available a small amount of space for International Society news. This was accepted and each National Society was asked to notify the Secretary General of

- (a) the names of soil mechanics journals in their countries willing to accept the suggestion, and
- (b) the names and addresses to which the news items should be sent.

12. The proposal from the Joint Australasian group for an International Research Centre to be run under the auspices of the Society was withdrawn from the agenda.

13. Prof. Zeitlen, Vice President for Asia, reported verbally on the activities during the last four years of the various conferences and symposia held in India, Israel and Japan and a list of these is given in Appendix D.

14. Prof. Trollope, Vice President for Australasia, reported on the activities in Australia and New Zealand and pointed out how even a slight increase in annual subscription was immediately reflected in a temporary decline in membership. A list of conferences and sym-

9. Une longue discussion a eu lieu au sujet de la langue officielle de la Société. L'anglais doit-il être la seule langue officielle, ou doit-on conserver l'anglais et le français? Outre ceux de langue française, de nombreux pays se sont manifestés en faveur du maintien du français. Ceci a paru être le vœu général de la Société. Aucun vote n'a eu lieu.

10.- La Société Nationale de l'Inde a proposé que la Société Internationale augmente ses activités en:

- (i) préparant et publiant des revues d'investigation
- (ii) publiant un Journal International
- (iii) stimulant l'échange de programmes de recherche, etc...

Ces propositions n'ont pas été acceptées mais le Prof. D. Mohan (Inde) et M. E. Zolkov (Israël) ont été priés de préciser leurs idées à ce sujet afin que leurs projets puissent être présentés lors de la prochaine réunion du Comité Exécutif, prix inclus. Le Secrétaire Général a accepté de prêter son aide ne en ce qui concerne l'établissement des prix.

11. Le Président a suggéré que l'un des moyens de réaliser certains des objectifs proposés par L'Inde, consisterait à demander aux revues spécialisées dans le domaine de la Mécanique des Sols de réserver un espace pour les nouvelles de la Société Internationale. Cette initiative a été acceptée de sorte que chaque Société Nationale a été priée de communiquer au Secrétaire Général:

- (a) les noms des revues spécialisées en mécanique des sols, qui seraient désireuses d'accepter cette suggestion.
- (b) le nom et l'adresse des personnes auxquelles les documents devraient être envoyés.

12. Proposition faite par le groupe d'Australasie en faveur de l'établissement d'un centre international de Recherche qui serait placé sous les auspices de la Société. Cette proposition a été retirée de l'agenda.

13. Le Prof. Zeitlen, Vice-Président pour l'Asie a fait ensuite un rapport verbal concernant les activités des différentes Sociétés Nationales de sa zone, durant les quatre dernières années. Différents symposiums dont la liste figure dans l'appendice D se sont déroulés en Inde, en Israël et au Japon.

14. Le Prof. Trollope, Vice-Président pour l'Australasie a fait un rapport concernant les



posia in this region is given in Appendix E.

The meeting adjourned at this point until 23rd August.

15. Mr. Kantey, Vice President for Africa reported on the activities within his zone and particularly of the major conference in Cape Town referred to in Appendix F. Supplementary information was given by M. Moussaoui on the activities of the Morocco National Society where useful field meetings have been held in cooperation with engineering geologists.

16. Dr. Turnbull, Vice President for North America gave an account of the activities within the region, culminating with the Mexico conference itself. A summary of some of the more important other happenings is given in Appendix G.

17. Dr. Moretto, Vice-President for South America, reported on the activity in this zone as summarized in Appendix H. A drive has been made to recruit new member countries in Central America and it is hoped that results will soon be evident.

18. Prof. de Beer gave the Vice President's report for Europe owing to the untimely death of Dr. Brinch Hansen which has been a great blow to the Region. The many activities of the various National Societies are summarized in Appendix I.

19. These Vice-Presidential reports are a new feature of our Executive Committee meetings and it was evident that they are of great value in giving a wide perspective of the Society's activities throughout the world. It was agreed that they should be a regular feature of Executive Committee meetings in future and the Vice-Presidents were warmly thanked for them, and for the work they have done in the last four years.

20. In order to avoid undesirable duplication from lack of consultation National Societies are asked to keep the Secretary General informed of their future plans with regard to conferences and symposia in their own countries. Vice Presidents are asked to do the same with regard to Regional Conferences to be arranged within their zone.

21. The presence of Prof. R. Peck in the

activités en Australie, et Nouvelle-Zélande. Il a déclaré qu'une augmentation, aussi légère soit-elle, du montant de la souscription annuelle entraînait immédiatement une réduction du nombre des membres. La liste des symposiums qui ont eu lieu dans cette région est fournie dans l'Appendice E.

15. Le Prof. Kantey, Vice-Président pour l'Afrique a fait un rapport sur ses activités dans sa zone et particulièrement sur la conférence du Cap mentionnée dans l'Appendice F. M. Maoussaoui a fourni des renseignements complémentaires en ce qui concerne les activités de la Société Nationale marocaine, qui a tenu des réunions très utiles en collaboration avec des géologues ingénieurs.

16. Le Dr. Turnbull, Vice-Président pour l'Amérique du Nord a fait un rapport sur les activités de sa région jusqu'à la conférence de Mexico. Un compte-rendu des plus importants événements de cette zone est donné dans l'Appendice G.

17. Le Dr. Moretto, Vice-Président pour l'Amérique du Sud, a fait un rapport sur sa zone. Voir Appendice H. Des efforts ont été réalisés afin de recruter de nouveaux membres parmi les pays d'Amérique Centrale et l'on espère que les résultats se manifesteront bientôt.

18. Etant donné le décès du Dr. Brinch Hansen, décès qui a porté un grand coup à la région, le Prof. de Beer a fourni le rapport du Vice-Président pour l'Europe.

Les activités des nombreuses Sociétés Nationales de cette région sont résumées dans l'Appendice I.

19. Ces rapports des Vice-Présidents apportent un élément nouveau dans les réunions de notre Comité Exécutif. Il est évident que ces rapports sont extrêmement utiles étant donné qu'ils fournissent un vaste panorama des activités des Sociétés à travers le monde. Il a été convenu que cette mesure serait poursuivie régulièrement au cours des prochaines réunions du Comité Exécutif. Les Vice-Présidents ont été chaleureusement remerciés pour cette initiative ainsi que pour le travail qu'ils ont réalisé au cours des quatre dernières années.

20. Afin d'éviter que le manque d'information n'entraîne des répétitions non souhaitables, les Sociétés Nationales sont désormais priées de mettre le Secrétaire Général au courant de leurs projets en ce qui concerne les conférences et les symposiums devant avoir lieu dans leurs propres pays. Les Vice-Présidents sont également priés d'agir de même en ce qui concerne les Conférences Régionales devant se dérouler dans leur zone.

meetings was noted with acclamation.

22. The Indian Delegate (Prof. Mohan) queried whether a minimum number of members should be specified in the By-Laws as being required in a National Society before it was acceptable for membership of the International Society. It was agreed that no number should be laid down.

23. The Secretary General requested each National Society to send to him in London a copy (in English or French) of their own statutes.

24. The report of the Advisory Committee was presented by the President and is given as Appendix J.

The arrangements adopted for the Mexico Conference were discussed in detail and were given general approval.

25. The Executive Committee approved the setting up of a new sub-committee with the following terms of reference:

- (i) to follow the Mexico Conference, its meetings, papers and arrangements
- (ii) to evaluate the 'quality' of the conference, its main sessions, specialty sessions and their activities, and to present the result in a report to the Executive Committee and
- (iii) based on their findings to draw up proposals for guidelines for the coming conference which can be presented to the Executive Committee to be accepted and eventually included in the By-Laws.

The following were appointed as members of the Conference Procedure Committee:

Dr. D.H. MacDonald (Canada), Chairman  
Professor E. H. Davis (Australia)  
Mr. B. Kjaernsli (Norway)  
with the Secretary General

26. The President outlined the history of the sub-committee on Literature Classification and International Abstracts Service, leading up to the spectacular achievement of Dr. Koenig and Mr. Kuehn and the German National Society in producing their new Geotechnical Abstracts on behalf of the International Society

21. La présence du Prof. R. Peck à la séance a été applaudie.

22. Le délégué de l'Inde, (M. le Prof. Mohan) a demandé si les statuts stipulaient un nombre minimum de membres, comme condition à remplir pour qu'une Société soit acceptée comme membre de la Société Internationale. Il a été convenu qu'aucun chiffre ne serait exigé.

23. Le Secrétaire Général a prié chaque Société Nationale de lui expédier à Londres un exemplaire (en anglais ou en Français) de ses propres statuts.

24. Le rapport du Comité consultatif a été présenté par le Président. Voir Appendice J. La procédure adoptée pour la Conférence de Mexico a été discutée en détail et généralement approuvée.

25. Le Comité Exécutif a approuvé l'établissement d'un nouveau sous-comité dont les fonctions seraient les suivantes:

- (i) suivre le Congrès de Mexico; ses réunions, ses exposés et son organisation
- (ii) évaluer la qualité de ce dernier en ce qui concerne les séances plénières, les séances spéciales et leurs activités; présenter un rapport à ce sujet au Comité Exécutif
- (iii) rapport susceptible de servir de base pour l'élaboration de directives générales en vue de prochaines conférences. Ces directives devront être soumises, pour approbation, au Comité Exécutif et pourront être éventuellement comprises dans les Statuts.

Les personnes désignées comme membres de ce Sous-comité de Conférence sont les suivantes:

Dr. D.H. MacDonald (Canada), Président  
Prof. E.H. Davis (Australie)  
M. B. Kjaernsli (Norvège)

Avec le Secrétaire Général

26. Le Président a récapitulé l'histoire des activités du Sous-comité en ce qui concerne le Classement des documents et l'établissement des Résumés Internationaux; activités qui ont abouti à la publication par la Société Internationale du nouveau Précis Géotechnique, oeuvre du Dr. Koenig, de M. Kuehn et de la Société Nationale Allemande.

Le rapport du Sous-comité a été présenté par le Dr. T.C. Kenney lequel a été cordialement remercié pour son travail. Le compte-rendu de ce rapport figure dans l'appendice K. Les

The report of the sub-committee is given in Appendix K and was presented by Dr. T.C. Kenney who was warmly thanked for their work. Professor Casagrande was particularly mentioned for his efforts over many years. Dr. Koenig referred to the cost of producing the abstracts and states that it would become economical only when the number of subscribers reached 2,000. In the meantime, for three years only, the deficit was being met by a generous grant from the Volkswagen Foundation. Dr. Kuehn described the details of the abstract system. The initiative in producing these abstracts was warmly applauded and the Executive Committee agreed that they should be given the Society's full backing.

National Societies and Vice-Presidents are asked in particular to give wide publicity to them.

It was agreed that this sub-committee should be reconstituted as an Abstract Liaison Committee, with the following membership:

Dr. T.C. Kenney (Canada), Chairman  
Mr. J. Florentin (France)  
Mr. N. Flodin (Sweden)  
Prof. I. Sovinc (Yugoslavia)

and ex officio:

Mr. H. Kuehn (Germany)  
Prof. H. Petermann (Germany)  
and a representative of A.S.C.E.

27. The interim report of the Committee on Definitions, Symbols and Terminology is attached as Appendix L and was presented by Prof. Kerisel. Further discussion on this subject is to take place at one of the current Special Sessions.

The Committee was thanked for their work and a new committee was asked to include recommended units as part of their final report which it was hoped would be available for the next Conference with the following membership:

Dr. H. Golder (Canada), Chairman  
Dr. G. Ter-Stepanian (USSR)  
Prof. S. B. Stearns (USA)  
Prof. E. Shultze (Germany)  
Mr. E. Sandegren (Sweden)  
Dr. L. Jürgensen (USSR)  
Prof. A. W. Bishop (UK)  
Mr. C. Shaerrer (Switzerland)

efforts déployés pendant de nombreuses années par le Prof. Casagrande ont fait l'objet d'un éloge spécial.

Le Dr. Koenig a fait allusion au prix de la publication des résumés et déclaré que cette publication ne pouvait être rentable que si le nombre des adhérents atteignait le chiffre de 2,000. En attendant, le déficit a été comblé pendant trois ans seulement par un don généreux de la Fondation Volkswagen.

Le Dr. Koenig a décrit en détail le système de l'élaboration des résumés.

La publication de ces résumés a été chaleureusement applaudie et le Comité Exécutif a demandé que l'action de la Société soit solidement appuyée dans ce sens.

Il a été décidé que ce sous-comité serait reconstitué en tant que Comité du Résumé, avec les membres suivants:

Dr. T.C. Kenney (Canada), Président  
M. J. Florentin (France)  
M. N. Flodin (Suède)  
Prof. I. Sovinc (Yougoslavie)

et ex officio:

M. H. Kuehn (Allemagne)  
Prof. H. Petermann (Allemagne)  
et le représentant de A.S.C.E.

27. Le rapport du Comité des Définitions, des Symboles, et de la Terminologie a été présenté par le Prof. Kerisel. Ce rapport fait l'objet de l'Appendice L. Les discussions ultérieures à ce sujet auront lieu au cours d'une des séances spéciales.

Le Comité a été remercié pour son travail. Le nouveau comité a été prié d'inclure dans son rapport final une liste de recommandations. On espère que ce rapport final sera prêt pour la prochaine conférence qui comprendra les membres suivants:

Dr. H. Golder (Canada) Président  
Dr. G. Ter-Stepanian (U.R.S.S.)  
Prof. S.B. Stearns (E.U.A.)  
Prof. E. Schultze (Allemagne)  
M. N.E. Sandegren (Suède)  
Dr. L. Jürgensen (U.R.S.S.)  
Prof. A.W. Bishop (Royaume-Uni)  
Prof. C. Shaerrer (Suisse)

28. Le Dr. Aitchison dont le rapport fait l'objet de l'Appendice M a parlé du travail du Sous-Comité en ce qui concerne l'échantillonnage des sols. Le Comité a été remercié pour son travail. Une séance spéciale sur ce sujet aura lieu lors de la prochaine conférence. Le Comité devra donc continuer son travail jusqu'à la prochaine conférence qui comprendra les membres suivants:

Dr. G.D. Aitchison (Australie) Président

28. Dr. Aitchison spoke on the work of the

sub-committee on Soil Sampling, whose interim report is attached as Appendix M.

The Committee was thanked for their work. It was noted that there will be a Special Session on this topic at the forthcoming conference and the Committee was asked to continue their work until the next conference with the following membership:

Dr. G. D. Aitchison (Australia), Chairman  
Dr. B. Broms (Sweden)  
Mr. H. Mori (Japan)  
Prof. J. O. Osterberg (USA)  
Dr. M.J. Hvorslev (USA), Special Adviser  
with Mr. M. Wood (Australia), Secretary

29. Prof. Tsytovich (USSR) gave a formal invitation to the Executive Committee for the 1973 International Conference to be held in Moscow; and Mr. Lundstrom (Sweden) gave a similar invitation for it to be held in Stockholm. The invitation which had been received from India was withdrawn by Prof. Mohan.

After a secret ballot it was decided by 25-19 that the invitation from USSR should be gratefully accepted and all the countries which had issued invitations were thanked for them.

30. It was agreed that a meeting of the Executive Committee should be held before the next Conference and the following invitations were voted upon without introduction or discussion:

Australia	(Melbourne)	(13)
S.E. Asia	(Bangkok)	(10)
Hungary	(Budapest)	(12)
U.S.A.	(Puerto Rico)	( 8)

The votes recorded are given in parenthesis above and the next Executive Committee will therefore be held in Australia. Again each National Society was thanked for its invitation.

31. It was agreed that we should continue our U.A.T.I. subscription and Mr. Mayer was thanked for having represented us at many of their meetings in Paris.

32. The President briefly reported on meetings with the President of the International Society of Rock Mechanics where cooperation between our two societies was discussed. Such cooperation also continues with other bodies.

Dr. V. Broms (Suède)  
M H. Mori (Japon)  
Prof. J. O. Osterberg (E.U.A.)  
Dr. M.J. Hvorslev (E.U.A.) conseiller  
spécial  
M. M. Wood (Australie) Secrétaire

29. Le Prof. Tsytovich (U.R.S.S.) a invité officiellement le Comité Exécutif a la Conférence Internationale qui doit avoir lieu a Moscou en 1973; M. Lundstrom (Suède) a formulé une invitation similaire pour le Congrès qui doit avoir lieu a Stockholm: L'invitation formulée par l'Inde a été retirée par le Prof. Mohan.

Après une vote secret, il a été décidé par 25 voix contre 19 que l'invitation de l'URSS serait acceptée. On a remercié également les autres pays qui avaient formulé des invitations.

30. Il a été convenu qu'une réunion du Comité Exécutif devrait avoir lieu avant la prochaine Conférence. Un vote a été réalisé en ce qui concerne les invitations suivantes:

Australie	(Melbourne)	(13)
Asie du Sud-Est	(Bangkok)	(10)
Hongrie	(Budapest)	(12)
E. U. A.	(Puerto Rico)	( 8)

Les voix recueillies sont indiquées entre parenthèses. La réunion du Comité Exécutif aura donc lieu en Australie. De nouveau chaque Société Nationale a été remerciée pour son invitation.

31. Il a été convenu que nous devrions continuer notre souscription a la U.A.T.I. On a remercié M. Mayer de nous avoir représenté a Paris au cours d'un grand nombre de réunions.

32. Le président a fait un bref rapport concernant les réunions tenues avec le Président de la Société Internationale de Mécanique des Roches, réunions au cours desquelles il a été question de la coopération entre nos deux institutions. Cette coopération sera poursuivie dans l'avenir.

33. La séance a été levée à 17h.

L. Bjerrum  
Président

Mexico, 23 Août, 1969.

33. The meeting was closed at 17:45.

Signed in and on behalf of the Committee

L. Bjerrum,  
President

Mexico City, 23 August, 1969

APPENDIX A

APPENDICE A

	Europe	Asia Asie	Africa Afrique	North America Amerique du Nord	South America Amerique du Sud	Austra lasia Austra- lasie	TOTAL
Argentina/Argentine	-	-	-	-	66	-	66
Australia/Australie	-	-	-	-	-	323	323
Austria/Autriche	31	-	-	-	-	-	31
Belgium/Belgique	61	-	-	-	-	-	61
Brazil/Brésil	-	-	-	-	107	-	107
Bulgaria/Bulgarie	92	-	-	-	-	-	92
Canada	-	-	-	465	-	-	465
China/Chine	-	100	-	-	-	-	100
Colombia/Colombie	-	-	-	-	12	-	12
Czechoslovakia/Tchécoslovaquie	37	-	-	-	-	-	37
Denmark/Danemark	56	-	-	-	-	-	56
Ecuador	-	-	-	-	36	-	36
Finland/Finlande	79	-	-	-	-	-	79
France	202	-	-	-	-	-	202
Germany/Allemagne	778	-	-	-	-	-	778
Greece/Grèce	37	-	-	-	-	-	37
Hungary/Hongrie	23	-	-	-	-	-	23
India/Inde	-	848	-	-	-	-	848
Ireland/Irlande	7	-	-	-	-	-	7
Israel/Israël	-	95	-	-	-	-	95
Italy/Italie	341	-	-	-	-	-	341
Japan/Japon	-	168	-	-	-	-	168
Mexico/Mexique	-	-	-	143	-	-	143
Morocco/Maroc	-	-	96	-	-	-	96
Netherlands/Pays-Bas	70	-	-	-	-	-	70
New Zealand/Nouvelle Zélande	-	-	-	-	-	127	127
Norway/Norvège	150	-	-	-	-	-	150
Peru/Pérou	-	-	-	-	45	-	45
Poland/Pologne	24	-	-	-	-	-	24
Portugal/Portugal	150	-	-	-	-	-	150
Rhodesia/Rhodésie	-	-	147	-	-	-	147
South Africa/Afrique du Sud	-	-	368	-	-	-	368
South-East Asia/Asie du Sud-Est	-	196	-	-	-	-	196
Spain/Espagne	414	-	-	-	-	-	414
Sweden/Suède	203	-	-	-	-	-	203
Switzerland/Suisse	770	-	-	-	-	-	770
Turkey/Turquie	42	-	-	-	-	-	42
United Kingdom/Royaume-Uni	714	-	-	-	-	-	714
U.S.A./E.U.A.	-	-	-	820	-	-	820
U.S.S.R./U.R.S.S.	159	-	-	-	-	-	159
Venezuela/Vénézuéla	-	-	-	-	120	-	120
Yugoslavia/Yougoslavie	54	-	-	-	-	-	54
Countries:	23	5	3	3	6	2	42
Members:	4,494	1,407	611	1,428	386	450	8,776

33. The meeting was closed at 17:45.

Signed in and on behalf of the Committee

L. Bjerrum,  
President

Mexico City, 23 August, 1969

APPENDIX A

APPENDICE A

	Europe	Asia Asie	Africa Afrique	North America Amerique du Nord	South America Amerique du Sud	Austra lasia Austra- lasie	TOTAL
Argentina/Argentine	-	-	-	-	66	-	66
Australia/Australie	-	-	-	-	-	323	323
Austria/Autriche	31	-	-	-	-	-	31
Belgium/Belgique	61	-	-	-	-	-	61
Brazil/Brésil	-	-	-	-	107	-	107
Bulgaria/Bulgarie	92	-	-	-	-	-	92
Canada	-	-	-	465	-	-	465
China/Chine	-	100	-	-	-	-	100
Colombia/Colombie	-	-	-	-	12	-	12
Czechoslovakia/Tchécoslovaquie	37	-	-	-	-	-	37
Denmark/Danemark	56	-	-	-	-	-	56
Ecuador	-	-	-	-	36	-	36
Finland/Finlande	79	-	-	-	-	-	79
France	202	-	-	-	-	-	202
Germany/Allemagne	778	-	-	-	-	-	778
Greece/Grèce	37	-	-	-	-	-	37
Hungary/Hongrie	23	-	-	-	-	-	23
India/Inde	-	848	-	-	-	-	848
Ireland/Irlande	7	-	-	-	-	-	7
Israel/Israël	-	95	-	-	-	-	95
Italy/Italie	341	-	-	-	-	-	341
Japan/Japon	-	168	-	-	-	-	168
Mexico/Mexique	-	-	-	143	-	-	143
Morocco/Maroc	-	-	96	-	-	-	96
Netherlands/Pays-Bas	70	-	-	-	-	-	70
New Zealand/Nouvelle Zélande	-	-	-	-	-	127	127
Norway/Norvège	150	-	-	-	-	-	150
Peru/Pérou	-	-	-	-	45	-	45
Poland/Pologne	24	-	-	-	-	-	24
Portugal/Portugal	150	-	-	-	-	-	150
Rhodesia/Rhodésie	-	-	147	-	-	-	147
South Africa/Afrique du Sud	-	-	368	-	-	-	368
South-East Asia/Asie du Sud-Est	-	196	-	-	-	-	196
Spain/Espagne	414	-	-	-	-	-	414
Sweden/Suède	203	-	-	-	-	-	203
Switzerland/Suisse	770	-	-	-	-	-	770
Turkey/Turquie	42	-	-	-	-	-	42
United Kingdom/Royaume-Uni	714	-	-	-	-	-	714
U.S.A./E.U.A.	-	-	-	820	-	-	820
U.S.S.R./U.R.S.S.	159	-	-	-	-	-	159
Venezuela/Vénézuéla	-	-	-	-	120	-	120
Yugoslavia/Yougoslavie	54	-	-	-	-	-	54
Countries:	23	5	3	3	6	2	42
Members:	4,494	1,407	611	1,428	386	450	8,776

## Income and Expenditure / Recettes et Depenses 1966 - 1969

	YEARS ENDED FEBRUARY 28th:				PERIOD 28 FEBRUARY 1966
	1966	1967	1968	1969	TO JULY 1969
	EXERCICE AU 28 FEVRIER				PERIODE 28. 2. 66 A
					JUILLET 1969
	£	£	£	£	£
<b>RECEIPTS/RECUS:</b>					
Balance in hand/Bilan	1456	396	232	2317	3887
Subscriptions/Souscriptions	872	719	2635	1741	2028
Bank Interest/Intérêt Bancaire	-	-	-	17	
£	2327	1115	2867	4075	5815
	£	£	£	£	£
<b>PAYMENTS/PAIEMENT:</b>					
List of Members/Liste des Membres	1600	317	424	-	4725
U.A.T.I. Subscriptions/U.A.T.I. Souscriptions	43	43	57	67	-
Postages and Sundries/Frais d'envoi et divers	1	144	69	121	23
Congress and Travelling Expenses/Frais: Congrès et Voyage	287	379	-	-	663
£	1831	883	550	188	5411
<i>Balance forward/Solde</i>	£ 396	232	2317	3887	£ 504

## APPENDIX C (i) CONSTITUTION\*

## APPENDICE C (i) STATUTS\*

\* This Constitution should be read in conjunction with the accompanying By-Laws.

\* Ce texte devrait être lu en même temps que le règlement intérieur ci-joint.

### NAME

1. The name of the Society is: International Society for Soil Mechanics and Foundation Engineering; in French: Société Internationale de Mécanique des Sols et des Travaux de Fondations.

### LE NOM

1. Le nom de la Société est: International Society for Soil Mechanics and Foundation Engineering - en français: Société Internationale de Mécanique des Sols et des Travaux de Fondations.

### AIM

2. The aim of the Society is the promotion of international cooperation among engineers and scientist for the advancement of knowledge in the field of soil mechanics and its practical applications, and in the civil engineering applications of geology, and of rock, snow and ice mechanics.

### LE BUT

2. Le but de la Société est de promouvoir une coopération internationale parmi les Ingénieurs et les Chercheurs pour faire progresser les connaissances dans le domaine de la mécanique des sols et de ses applications pratiques et dans celui des applications au Génie Civil de la géologie et de la mécanique des roches; de la neige et de la glace.

3. The Society will accomplish its aim

- a) by holding international conferences at approximately four-year intervals;
- b) by holding Executive Committee meetings at the time of the international conferences and, if required, at a suitable time between conferences;
- c) by promoting regional conferences and other meetings at intervals;
- d) by cooperation with other organizations, national and international, whose aims are complementary to those of the Society;
- e) by interchange of information among its National Societies, including publication of lists of members and other documents;
- f) by promoting the publication of literature abstracts.

3. La Société atteindra son objet:

- a. en tenant des conférences internationales, environ tous les quatre ans;
- b. en tenant des réunions exécutives, environ tous les deux ans;
- c. en provoquant des conférences régionales et d'autres réunions sans périodicité définie;
- d. en coopérant avec d'autres organisations, nationales ou internationales, dont les buts sont complémentaires de ceux de la Société;
- e. en diffusant des informations parmi ses Sociétés nationales, y compris la publication des listes de membres ou d'autres documents;
- f. en favorisant la publication d'extraits de publications.

### LANGUAGES

4. The official languages of the Society are English and French.

### LANGUES

4. Les langues officielles de la Société sont l'anglais et le français.

### MEMBERSHIP

5. The International Society is composed of National Societies elected into membership by the Executive Committee. To

### PARTICIPATIONS

5. La Société internationale est composée de Sociétés nationales admises comme membres par le Comité Exécutif. Pour



remain in membership a National Society must pay its subscription each year. The Executive Committee has the right to terminate the membership of any National Society by a simple majority vote.

6. Each individual or collective member of a National Society is automatically a member of the International Society. In countries where no National Society exists, the resident shall apply for admission to a National Society of his choice willing to accept his application.

#### NATIONAL SOCIETIES

7. A National Society may be affiliated to other engineering societies, and it is free to establish its articles of association and its organization in accordance with their requirements.
8. A National Society shall at all times keep the Secretary General informed about its address and the names of its officers.
9. The Officers of the International Society are:
  - i) The President
  - ii) The Vice-Presidents
  - iii) The Secretary General

#### President

10. The term of office of the President shall normally occupy four years, in general from the end of one International Conference to the end of the next Conference.
11. The President shall be nominated in accordance with the rules stated in the By-Laws and elected by the Executive Committee.
12. In the event of the resignation or death of the President, a new President shall be appointed by the Vice-Presidents for the unexpired term of office.

Should the President be unable to act an International Conference he shall ask one of the Vice-Presidents to act in his place.
13. A President shall not be eligible for re-election on completion of his full term of office.
14. The President shall represent the International Society and shall perform the duties pertaining to such office, as well as those entrusted to him by the Constitution and By-Laws or by the Executive Committee. He cannot at an Executive Committee Meeting at the same time be a voting representative of his country. He shall be responsible, in collaboration with the Secretary General, for

rester membre, une Société nationale doit payer sa cotisation chaque année. Le Comité international a le droit de mettre fin à la participation de toute Société nationale par un vote à la majorité simple.

6. Chaque membre individuel ou collectif d'une Société nationale est automatiquement membre de la Société internationale.

Les personnes résidant dans des pays où il n'existe pas de Société nationale devront s'adresser, pour leur admission, à une Société nationale de leur choix prête à accepter leur demande.

#### SOCIETES NATIONALES

7. Une Société nationale peut être affiliée à d'autres Sociétés d'Ingénieurs et elle est libre de rédiger ses clauses d'association et son organisation en accord avec leurs exigences.
8. Une Société nationale doit, à tout moment, tenir le Secrétaire Général informé de son adresse et des noms des membres de son Bureau.
9. Les responsables de la Société internationale sont:
  - i) Le Président
  - ii) Les Vice-Presidents
  - iii) Le Secrétaire Général

#### Président

10. Le mandat de Président est normalement de quatre ans; en général de la fin d'une conférence internationale à la fin de la conférence suivante.
11. Le Président sera choisi conformément aux règles fixées par le Règlement Intérieur et sa nomination devra être approuvée par le Comité Exécutif.
12. Dans le cas de la démission ou du décès du Président, un nouveau Président sera nommé par les Vice-Presidents pour la fin de la durée du mandat.

Si le Président se trouve indisponible lors d'une Conférence internationale, il devra désigner l'un des Vice-Presidents pour le remplacer.
13. A la fin de son mandat, le Président ne sera pas rééligible.
14. Le Président représentera la Société internationale et devra assurer les tâches relatives à ce mandat de même que celles qui lui seront confiées par les Statuts ou le Règlement Intérieur ou par le Comité Exécutif. Il ne peut voter en tant que représentant de son pays lors des réunions du Comité Exécutif. Il sera responsable avec le Secrétaire Général, de la conduite des

the conduct of the affairs of the Society.

#### Vice-Presidents

15. One Vice-President shall represent each of the following geographical zones:
- Africa
  - Asia
  - Australasia
  - Europe
  - North America
  - South America

The National Societies within each of these zones are given in Appendix A of the By-Laws. New National Societies which may be formed in Central America shall be assigned to either North America or South America according to the wish of the National Society itself and the Officers shall be informed of the decision.

16. The term of office for the Vice-Presidents shall normally occupy four years, i.e. from the end of one International Conference to the end of the next Conference.
17. The Vice-President shall be nominated by the National Societies within the various geographical zones in accordance with the rules stated in the By-Laws, and formally elected by the Executive Committee at its next meeting.
18. A Vice-President cannot at an Executive Committee Meeting at the same time be a voting representative of his country, except as indicated in the By-Laws.
19. In the event of the death or retirement of a Vice-President his successor shall be appointed by the President for the unexpired term of office. Should a Vice-President be unable to act at an International Conference, the President shall invite his successor to act in his place.
20. A Vice-President shall not be eligible for re-election on completion of his full term of office.
21. The Vice-President shall represent the International Society at the regional conferences and other meetings to be held under the auspices of the International Society within his geographical zone.

#### Secretary General

22. The Secretary General shall be appointed at an Executive Committee meeting at terms to be agreed. He shall be responsible under the general direction of the President, for the conduct of all corres

affaires de la Société.

#### Vice-Président

15. Un Vice-Président devra représenter chacune des zones géographiques suivantes:

- Afrique
- Amérique du Nord
- Amérique du Sud
- Asie
- Australasie
- Europe

Les Sociétés nationales comprises dans chacune de ces zones sont indiquées dans l'annexe A du Règlement Intérieur. Les nouvelles Sociétés nationales qui puissent se constituer en Amérique Central seront affectées, selon leur propre choix, soit à la zone d'Amérique du Nord, soit à la zone d'Amérique du Sud. Leur décision devra être communiquée aux responsables.

16. La durée du mandat des Vice-Présidents devrait normalement être de quatre ans, c'est à dire de la fin d'une conférence internationale à la fin de la conférence suivante.
17. Les Vice-Présidents seront nommés par les Sociétés nationales à l'intérieur des différentes zones géographiques conformément aux dispositions établies par les règlements, et formellement élus par le Comité Exécutif lors de sa prochaine réunion.
18. Un Vice-Président ne peut voter comme représentant de son pays lors d'une réunion du Comité Exécutif, sauf dans les cas indiqués par le Règlement Intérieur.
19. Dans le cas du décès ou de la démission d'un Vice-Président; son successeur sera nommé par le Président pour le reste de la durée de son mandat. Si un Vice-Président ne peut pas assister à une conférence, le Président invitera son successeur à occuper son poste.
20. Un Vice-Président ne pourra pas être réélu à la fin de son mandat.
21. Un Vice-Président représentera la Société internationale aux conférences régionales et aux autres réunions qui seront tenues sous les auspices de la Société internationale à l'intérieur de sa zone géographique.

#### Secrétaire Général

22. Le Secrétaire Général est nommé par le Comité Exécutif, dans des conditions qui feront l'objet d'un accord. Il est responsable, sous la direction générale du Président, de toute la corres

pondance and current business of the Society. He shall be responsible for the preparation and distribution of the Agenda of the Executive Committee meetings and for the preparation and maintenance of minutes of such meetings and of reports thereon. At an Executive Committee Meeting he cannot represent his own country.

23. The Secretary General shall send to each National Society an annual account of the dues owing, and shall ensure that all contributions and dues paid to the Society are placed in a separate account and that a record is kept. He is responsible for keeping the accounts of the Society, for the preparation of the annual budget of receipts and expenditures and for payments for the Society up to the limit of the approved budget. He shall acknowledge all the money received and only he or the President may authorize expenditures. The Secretary General shall prepare a summary of the accounts for each meeting of the Executive Committee and shall give any explanation required of expenses incurred.
24. The Secretary General is responsible for the reproduction and distribution of the List of Members in accordance with the instructions outlined by the Executive Committee.
25. The location of the Secretariat shall be agreed by the Executive Committee.

#### EXECUTIVE COMMITTEE

26. The Executive Committee for any meeting shall consist of the Officers of the International Society and up to two representatives from each National Society currently in membership, one of whom shall be designated in advance to act as the voting member. If the voting member is unable to act, the other delegate may act for him.
27. Executive Committee meetings shall be held
  - a) at the time of the International Conference and, if required;
  - b) at a suitable time between Conferences.
28. The conduct of an Executive Committee meeting by the President, the discussion of matters on the Agenda or of any amendments put forward, shall be in accordance with the rules set out in the By-Laws.
29. For the valid constitution of an Executive Committee meeting at least one-third of the total numbers of National Societies should have a representative

pondance et du travail courant de la Société. Il est responsable de la préparation et de la diffusion de l'ordre du jour des réunions du Comité Exécutif et de la préparation et de la mise au point des procès-verbaux et des rapports de ces réunions.

Lors d'une réunion du Comité Exécutif, il ne peut représenter son propre pays.

23. Le Secrétaire Général devra s'assurer que toutes les cotisations et droits payés à la Société sont versés à un compte séparé et qu'un relevé en est fait. Il est responsable de la tenue des comptes de la Société, de la préparation du budget annuel, des recettes et des dépenses de la Société et des paiements dans la limite du budget approuvé. Il devra donner quittance pour toutes les sommes reçues et lui ou le Président pourront seuls autoriser des dépenses. Le Secrétaire Général devra préparer un résumé des comptes pour chaque réunion du Comité Exécutif et devra donner toutes explications demandées concernant les dépenses exposées.
24. Le Secrétaire Général est responsable de la reproduction et de la diffusion des listes des membres, conformément aux instructions du Comité Exécutif.
25. Le siège du Secrétariat devra être approuvé par le Comité Exécutif

#### COMITE EXECUTIF

26. Lors de chacune de ses réunions, le Comité Exécutif sera constitué par le Bureau de la Société internationale et par deux représentants de chaque Société nationale dont l'un devra être désigné par avance comme le membre votant. Si le membre votant est indisponible, il sera remplacé par le second délégué
27. Les réunions du Comité Exécutif devront être tenues environ tous les deux ans:
  - a) à l'époque des Conférences internationales;
  - b) à une date convenable entre les Conférences.
28. La direction d'une réunion du Comité Exécutif par le Président, la discussion des questions portées à l'ordre du jour ou de toutes modifications proposées devront être faites conformément aux dispositions établies par le Règlement Intérieur.
29. La validité d'une réunion du Comité Exécutif nécessite la présence du moins un tiers du nombre total des Sociétés nationales avec un pouvoir.

present with voting powers, except if changes in the Constitution are to be made when the quorum must be as shown in paragraphs 35 and 36.

Dans le cas où des modifications doivent être apportées aux Statuts et au Règlement Intérieur voir paragraphe 35 et 36.

30. The Executive Committee may set up, by a plain majority of votes, standing and ad-hoc sub-committee and working parties with whatever powers and terms of reference it may decide.

30. Le Comité Exécutif peut créer à la majorité simple des voix, des sous-Comités permanents ou ad-hoc, et des groupes de travail dont il fixera les attributions et la durée.

#### CONFERENCES

31. International Conferences shall be held approximately every fourth year in a country to be decided upon by the Executive Committee. The organization and financing of an International Conference are the responsibility of the National Society of the host country. The National Society is obliged to follow the principles, rules and procedures for the Conference set out in the By-Laws and decided upon by the preceding Executive Committee or by the Officers of the Society.

32. The National Society responsible for each conference shall determine the individual registration fees for the Conference, but these shall be approved by the Secretary General in consultation with the President.

33. National Societies are encouraged to organise technical meetings and conferences but these may be termed Regional Conferences of the International Society only if the time, place and subject have been approved by the appropriate Vice-President in consultation with the Secretary General.

#### CONFERENCES

31. Des Conférences internationales auront lieu environ tous les quatre ans dans un pays choisi par le Comité Exécutif. Le pays invitant est responsable de l'organisation et du financement de la Conférence internationale. La Société nationale est tenue de se conformer aux directives, règles et procédures figurant dans le Règlement Intérieur et décidés par le précédent Comité Exécutif.

32. La Société nationale responsable de chaque conférence devra déterminer les droits d'inscription individuels, mais ceux-ci devront être approuvés par le Secrétaire Général, en accord avec le Président.

33. Les Sociétés nationales sont invitées à organiser des réunions techniques et des conférences, mais celles-ci ne pourront être considérées comme conférences régionales de la Société internationale que si l'époque, le lieu et le sujet ont été approuvés par le Vice-Président intéressé, en accord avec le Secrétaire Général.

#### SUBSCRIPTIONS AND CONTRIBUTIONS

34. For the purposes of meeting the expenses incurred by the Society for its operation, each National Society shall pay its subscription annually in advance.

#### COTISATIONS ET CONTRIBUTIONS

34. Dans le but de couvrir les dépenses exposées par la Société pour son activité chaque Société nationale devra régler sa cotisation chaque année, par anticipation.

#### AMENDMENTS TO CONSTITUTION AND BY-LAWS

35. Amendments to this Constitution may be proposed by any National Society. Such amendments shall be submitted in writing to the Secretary General, early enough to have the proposal submitted to all National Societies at least three months prior to the Executive Committee meeting, at which the amendment is to be placed on the Agenda.

Adoption of an amendment will require at least two-thirds of the total member countries to be represented at the meeting and an affirmative vote of no less than two-thirds of those members who are present and entitled to vote.

Any member country which will not be represented at the meeting may submit its

#### MODIFICATIONS AUX STATUTS ET RÈGLEMENTS

35. Des modifications aux présent Statuts peuvent être proposées par les Sociétés nationales. De telles modifications devront être adressées, par écrit, au Secrétaire Général, assez tôt pour que la proposition soit soumise à toutes les Sociétés nationales au moins trois mois avant la réunion du Comité Exécutif dont l'ordre du jour devra comporter les modifications proposées. L'adoption d'une modification exigera au moins les deux tiers du total des pays devant être représentés à la réunion et un vote positif d'un minimum de deux tiers des membres qui sont présents et habilités à voter. Tout pays qui ne sera pas représenté à la réunion

views and vote in writing in accordance with the rules set out in the By-Laws. In this event that member country will be regarded as being present for the purpose of the quorum for the vote.

36. Amendments to the By-Laws shall follow the procedure set out in paragraph 35, except that a simple majority in favour of the amendments is required, instead of two-thirds as above.

**APPENDIX C (ii) BY-LAWS** (These By-Laws should be read in conjunction with the Society's Constitution)

MEMBERSHIP

1. When there exists in a country a National Society it may ask to become a member of the International Society. To do this, it should send a formal application to the Secretary General signifying that it wishes to become a member and is prepared to adhere to the Constitution and to collaborate fully with the Society. Included with the application should be a copy of the statutes of the National Society (in English or French). If the Secretary General is satisfied that the application is in order he shall include it on the Agenda for the next Executive Committee meeting, which has the right to accept or reject it. No entrance fee is payable.
2. A country may not have more than one National Society, but a National Society may comprise a group of countries not otherwise in membership.
3. A National Society which has not paid its annual subscription within six months of the date it is due, without offering a reasonable excuse, will automatically cease to belong to the International Society but may rejoin without penalty by paying all the back subscriptions owing.
4. A National Society which has resigned its membership may apply to rejoin the Society. If accepted, the Executive Committee shall decide what entrance fee, if any, shall be payable.

NATIONAL SOCIETIES

5. If the statutes of a National Society are modified, copies of the proposed new statutes (in English or French) shall be forwarded to the Secretary General who will draw the Executive Committee's attention to any fundamental changes.

doit faire connaître son opinion et son vote par écrit, conformément à la procédure établie dans le Règlement Intérieur. Dans ce cas, ce pays sera considéré comme étant présent lors de la détermination du quorum pour le vote.

36. Les modifications du Règlement Intérieur doivent suivre la procédure établie au paragraphe 35, si ce n'est que dans ce cas seule une majorité simple en faveur des modifications est exigée au lieu des deux tiers indiqués plus haut.

**APPENDICE C (ii) REGLEMENT INTERIEUR** (Ce Règlement intérieur doit être lu en même temps que les Statuts de la Société)

PARTICIPATION

1. Lorsque dans un pays il existe une Société nationale, celle-ci peut demander à adhérer à la Société Internationale.  
Pour cela, la Société nationale de ce pays devra envoyer une demande officielle au Secrétaire Général indiquant qu'elle souhaite devenir membre et est prête à adhérer aux Statuts et à collaborer pleinement avec la Société. Doit être jointe à la demande une copie de ses Statuts en anglais ou en français.  
Si le Secrétaire Général reconnaît que la demande est en bonne et due forme, il l'inscrira à l'ordre du jour de la réunion suivante du Comité Exécutif qui a la faculté de l'accepter ou de la rejeter. Il n'y a pas de droit d'entrée.
2. Un pays ne peut avoir plus d'une Société nationale, mais une Société Nationale peut comprendre un groupe de pays qui ne font pas individuellement partie de la Société.
3. Une Société nationale qui n'a pas payé sa cotisation annuelle dans un délai de 6 mois à compter de la date où elle est due, sans présenter d'excuse raisonnable, cessera automatiquement de faire partie de la Société internationale, mais pourra la réintégrer sans pénalité en réglant toutes les cotisations arriérées.
4. Une Société nationale qui a résilié sa participation ou l'a laissée périmer pourra demander à réintégrer la Société. Si ceci est accepté, le Comité Exécutif devra décider si un droit d'entrée doit lui être demandé, et le cas échéant quel en sera le montant.

SOCIETES NATIONALES

5. Toute modification des Statuts d'une Société nationale doit être envoyée, en anglais ou en français, au Secrétaire Général qui attirera l'attention du Comité Exécutif sur les modifications importantes.

views and vote in writing in accordance with the rules set out in the By-Laws. In this event that member country will be regarded as being present for the purpose of the quorum for the vote.

36. Amendments to the By-Laws shall follow the procedure set out in paragraph 35, except that a simple majority in favour of the amendments is required, instead of two-thirds as above.

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Si le Secrétaire Général reconnaît que la demande est en bonne et due forme, il l'inscrira à l'ordre du jour de la réunion suivante du Comité Exécutif qui a la faculté de l'accepter ou de la rejeter. Il n'y a pas de droit d'entrée.
2. Un pays ne peut avoir plus d'une Société nationale, mais une Société Nationale peut comprendre un groupe de pays qui ne font pas individuellement partie de la Société.
3. Une Société nationale qui n'a pas payé sa cotisation annuelle dans un délai de 6 mois à compter de la date où elle est due, sans présenter d'excuse raisonnable, cessera automatiquement de faire partie de la Société internationale, mais pourra la réintégrer sans pénalité en réglant toutes les cotisations arriérées.
4. Une Société nationale qui a résilié sa participation ou l'a laissée périmer pourra demander à réintégrer la Société. Si ceci est accepté, le Comité Exécutif devra décider si un droit d'entrée doit lui être demandé, et le cas échéant quel en sera le montant.

SOCIETES NATIONALES

5. Toute modification des Statuts d'une Société nationale doit être envoyée, en anglais ou en français, au Secrétaire Général qui attirera l'attention du Comité Exécutif sur les modifications importantes.

## OFFICERS AND SECRETARIAT

### 6. President

About one year before the expiry of the term of office of the President, the Secretary General shall invite each National Society to send him its choice of member for the next President, having first ascertained that he is willing to serve if elected. The candidate needs not necessarily be a member of that National Society nor within its geographical zone. The Secretary General shall then send to each National Society a list of all the candidates and the Executive Committee shall be asked to vote on these names at their next meeting.

### 7. Vice-Presidents

About one year before the expiry of the term of office of the Vice-Presidents, the Secretary General shall notify the various National Societies that an election is to take place and shall invite them to return to him the names of up to two persons within their geographical zone who they have ascertained would be willing to serve if elected. The Secretary General shall then prepare a ballot list and shall invite the various National Societies to return their completed forms to him. The names of the successful candidates shall be reported to the next meeting of the Executive Committee. Should two candidates tie in the election, the President, after consultation with the existing Vice-President, shall decide which name to put forward.

### 8. Secretariat

The Secretariat is at the Institution of Civil Engineers, London, by agreement with that body.

## EXECUTIVE COMMITTEE MEETINGS

### 9. Place

An invitation to act as host for the Executive Committee meeting held between International Conferences should be sent to the Secretary General sufficiently early before an International Conference so that it can be placed on the Agenda of the Executive Committee meeting.

National Societies making arrangements for a Regional Conference should bear in mind that the time and place of their Conference might be appropriate for an Executive Committee meeting also. In general, two successive days are required for an Executive Committee meeting. If an invitation is received from more than one National Society the final selection will be made by ballot.

## BUREAU ET SECRETARIAT

### 6. Président

Environ un an avant l'expiration du mandat du Président de la Société internationale, le Secrétaire Général invitera chaque Société nationale à lui faire connaître la personne qu'elle propose pour le remplacer, après s'être assuré qu'elle est disposée à remplir ces fonctions si elle est élue. Un résumé de ses qualifications à ce poste devra être joint. Le candidat ne devra pas nécessairement être membre de cette Société nationale ni résider dans sa zone géographique. Le Secrétaire Général enverra ensuite à chaque Société nationale une liste de tous les candidats et le Comité Exécutif sera invité à voter sur ces noms lors de sa réunion suivante.

### 7. Vice-Présidents

Environ un an avant l'expiration du mandat des Vice-Présidents, le Secrétaire Général devra notifier aux diverses Sociétés nationales qu'une élection doit avoir lieu et les inviter à lui faire connaître le nom de deux personnes au maximum résidant dans leur zone géographique; et qui sont disposées à remplir le poste si elles sont élues. Le Secrétaire Général préparera ensuite une liste électorale et invitera les différentes Sociétés nationales à lui renvoyer leur bulletin complété. Les Noms des candidats élus seront notifiés à la séance suivante du Comité Exécutif. S'il y a ballottage entre deux candidats, le Président décidera en accord avec les Vice-Présidents lequel sera élu.

### 8. Secrétariat

Le Secrétariat se tient à l'Institution des Ingénieurs Civils à LONDRES en accord avec cet Organisme.

## REUNIONS DU COMITE EXECUTIF

### 9. Lieu

Tout pays proposant sa candidature pour organiser la réunion du Comité Exécutif qui aura lieu entre les Conférences internationales devra envoyer une invitation au Secrétaire Général suffisamment à l'avance pour que celui-ci puisse être portée à l'ordre du jour de la réunion du Comité Exécutif. Les Sociétés nationales organisant une conférence régionale ne devront pas oublier que la date et le lieu de leur conférence pourraient convenir également pour une réunion du Comité Exécutif. En général, deux jours consécutifs sont nécessaires pour une réunion du Comité Exécutif. Si plusieurs Sociétés nationales font parvenir une invitation, le choix fera l'objet d'un vote.

## 10. Agenda

National Societies must submit to the Secretary General six months before an Executive Committee meeting any item which they wish to have placed on the Agenda, and three months before the meeting the Secretary General will send the complete Agenda to each National Society. The Agenda will generally include the following items:

- a) Minutes of the previous meeting: matters arising
- b) Election of the new member countries
- c) Business raised by President
- d) Reports of Vice-Presidents
- e) Business raised by National Societies
- f) Business from other sources
- g) Financial statement for preceding period and draft budget for ensuing period
- h) Invitations for holding the next Conference or/Report and recommendations of Conference Procedure Committee
- i) Invitations for holding the next Executive Committee meeting (if applicable)
- j) Election of next President (if applicable)
- k) Names of new Vice-Presidents (if applicable)
- l) Reports of other standing committees
- m) Items submitted after preparation of Agenda, subject to agreement of Chairman
- n) Any other business.

## 11. Rules of Conduct of Meetings

### General

- i) The Chairman of meetings of the Executive Committee will normally be the President. In his absence, the Vice-President nominated by him, or one of the other Vice-Presidents, will act as Chairman
- ii) Members should address the Chair at all times
- iii) The minutes of Executive Committee meetings will be recorded by the Secretary General.

## 12. Voting

- i) Each National Society shall have one vote only.
- ii) Voting shall in general be by a show of hands except for the election of the President, the place for the next International Conference or Executive Committee meeting, or for other matters specified at the time by the Chairman.

## 10. Ordre du jour

Les Sociétés nationales doivent soumettre au Secrétaire Général, six mois avant une réunion du Comité Exécutif, toutes les questions qu'elles souhaitent voir porter à l'ordre du jour; quatre mois avant la réunion le Secrétaire Général enverra l'ordre du jour complet à chaque Société nationale. L'ordre du jour comportera généralement les rubriques suivantes:

- a) Procès verbal de la réunion précédente
- b) Admission de nouveaux pays membres
- c) Questions soulevées par le Président
- d) Rapports de Vice-Présidents
- e) Questions soulevées par les Sociétés nationales
- f) Questions émanant d'autres sources
- g) Situation financière pour la période précédente, et projet de budget pour la période à venir
- h) Invitation à recevoir la Conférence suivante ou rapport et recommandation du Comité d'organisation des Conférences
- i) Invitations pour la prochaine réunion du Comité Exécutif (s'il y a lieu)
- j) Election du Président suivant (s'il y a lieu)
- k) Noms des nouveaux Vice-Présidents (S'il y a lieu)
- l) Rapport des Comités permanents
- m) Rubriques soumises après la préparation de l'ordre du jour soumis à l'accord du Président
- n) Questions diverses.

## 11. Organisation des réunions

### Généralités

- i) Le Président de séance du Comité Exécutif sera normalement le Président. En son absence, le Vice-Président désigné par lui, ou l'un des autres Vice-Présidents, assurera la présidence
- ii) Les membres pourront s'adresser au Président à tout moment
- iii) Le procès verbal des réunions du Comité Exécutif sera dressé par le Secrétaire Général.

## 12. Vote

- i) Chaque Société nationale n'aura qu'une voix
- ii) Le vote s'effectuera à main levée excepté pour l'élection du Président, la place de la Conférence Internationale suivante ou la réunion du Comité Exécutif ou pour d'autres questions spécifiées par le Président



- iii) Resolutions may be made by a plain majority of those voting, except for those altering the Constitution, for which the assent of two thirds of those voting is required. In the event of an equality of votes on any motion the Chairman shall have a casting vote.
- iv) The Chairman is not entitled to vote except as specified above. Vice-Presidents are not entitled to vote except as indicated in (v) below. The Secretary General is not entitled to vote.
- v) A National Society which is unable to send a representative may delegate its voting rights either to their Vice-President, or to the delegate of another country within their region.

### 13. Motions, Amendments and Resolutions

In order to facilitate the conduct of business

- i) Motions will be printed on the agenda and no other motions will be discussed except by prior agreement with the Chairman. Minor matters may be raised under "Any other business".
- ii) A motion for which no seconder can be found cannot be discussed or put to the vote. If fails to the ground and cannot be reconsidered during the meeting. Motions by the Chairman require no seconder.
- iii) In discussing a motion no member may speak more than once, except at the invitation of the Chairman. The mover, however, will be given the right of reply at the end of the discussion.
- iv) After the discussion the Chairman will read the motion to ensure that the meeting knows exactly what it is voting for, and a vote will be taken.
- v) If the motion is passed; it becomes a resolution. Neither a resolution nor a failed motion may be reopened during the current session of the Committee.
- vi) Amendment is an alteration made by adding, changing, substituting or omitting a word, phrase or sentence of a motion. It may partially change the meaning of the motion, but must never contradict it. Amendments should be passed to the Chairman in writing.

- iii) Les résolutions peuvent être prises à la majorité simple des voix, excepté pour celles qui modifieraient les Statuts ou le Règlement Intérieur, et pour lesquels l'accord de deux tiers des votants est requis. Dans le cas d'égalité des voix sur une motion, la voix du Président sera prépondérante
- iv) Le Président ne prend pas part au vote, excepté dans le cas spécifiés ci-dessus. Les Vice-Présidents et le Secrétaire Général ne prennent pas part au vote, excepté dans les cas indiqués ci-dessous (v)
- v) Les Sociétés nationales non présentes à la réunion peuvent autoriser le Vice-Président de leur région à voter à leur place à condition qu'en soit averti à l'avance le Secrétaire Général.

### 13. Motions, Amendements et Résolutions

Afin de faciliter la conduite des travaux:

- i) Les points soumis au Comité seront inscrits à l'ordre du jour et aucune autre question ne sera discutée, sauf accord préalable du Président. Les questions mineurs peuvent être soulevées sous la rubrique "questions diverses"
- ii) Une motion qui n'a pas de "défenseur" ne peut être discutée ni soumise au vote, elle tombe et ne peut être reprise durant la session. Les motions émises par le Président n'ont pas besoin d'être présentées
- iii) Aucun membre ne peut prendre la parole plus d'une fois sur une motion, sauf invitation du Président. L'auteur de la motion aura cependant le droit de répondre à la fin de la discussion
- iv) Après la discussion, le Président lira la motion pour s'assurer que l'assemblée connaît exactement ce sur quoi elle vote, et il sera procédé au vote
- v) Si la motion est acceptée, elle devient une résolution. Ni une résolution ni une motion rejetées ne peuvent être remises en question pendant la session du Comité
- vi) Un amendement est une modification effectuée par addition, changement, substitution ou

- vii) A member who has spoken on a motion cannot move an amendment, but he may speak on an amendment moved by another.
- viii) If there are several amendments to a motion, they will be considered in order, so that an amendment to alter the first part of the motion comes first, etc.
- ix) Each amendment must be moved, seconded, discussed and voted on separately. Only one amendment may be discussed at a time.
- x) When the amendments have been separately disposed of, the Chairman will put the motion as amended clearly to the meeting. Further discussion may arise before the vote is taken.
- xi) There is right of reply for the mover of an amendment. If, however, his amendment has been carried and materially alters the sense of the motion, the amended motion will become the substantive motion, and the right of reply will devolve from the mover of the original motion to the mover of the amendment.
14. The minutes of the Executive Committee shall be approved and signed at the time of the meeting and a copy shall be sent by the Secretary General to each National Society.

#### INTERNATIONAL CONFERENCES

##### 15. Place

An invitation to act as host for an International Conference and the accompanying Executive Committee meeting must be received sufficiently long in advance so that it can be placed on the Agenda of the Executive Committee at the time of the previous Conference. Before accepting an invitation the Executive Committee shall be satisfied that the host country has:

- i) a meeting place with appropriate facilities.
- ii) suitable hotel accommodation for members and their wives.
- iii) sufficient of interest in the country for technical and other visits.
- iv) expressed a willingness to follow the Conference rules laid down by the Executive Committee or the Officers.

omission d'un mot, d'un membre de phrase ou d'une phrase d'une motion. Il peut changer partiellement la signification de la motion mais ne doit jamais la contredire. Les amendements devront être soumis au Président par écrit

- vii) Un membre qui a parlé sur une motion ne peut proposer un amendement, mais il peut parler sur un amendement proposé par un autre
- viii) S'il y a plusieurs amendements à une motion, ils seront étudiés dans l'ordre de façon qu'un amendement destiné à modifier la première partie de la motion vienne en premier, etc.
- ix) Chaque amendement doit être proposé, appuyé, discuté et faire l'objet d'un vote séparé. Un seul amendement peut être discuté à la fois
- x) Quand les amendements auront été traités séparément, le Président soumettra clairement la motion à l'assemblée. Une discussion complémentaire peut prendre place avant le vote
- xi) L'auteur d'un amendement n'a pas droit de réponse. Si cependant son amendement a été adopté et modifie sensiblement le sens de la motion, la motion amendée deviendra une motion formelle et le droit de réponse passera de l'auteur de la motion originale à l'auteur de l'amendement.

14. Les minutes du Comité Exécutif seront approuvées et soussignées lors de la réunion et le Secrétaire Général enverra une copie à chaque Société Nationale.

#### CONFERENCES INTERNATIONALES

##### 15. Lieu

Toute proposition d'organiser une Conférence internationale et la réunion correspondante du Comité Exécutif devra être reçue suffisamment longtemps, de façon qu'elle puisse être portée à l'ordre du jour de la réunion du Comité Exécutif au moment de la Conférence précédente.

Avant d'accepter une invitation, le Comité Exécutif devra s'assurer que le pays invitant a:

- i) un lieu de réunion avec les facilités appropriées
- ii) des installations hôtelières convenables pour les membres et

An invitation from a country which debar visiting members solely on grounds of nationality, race, creed or political views will not be acceptable. If an invitation is received from more than one National Society the final selection shall be made secret ballot.

- leurs épouses
- iii) une possibilité suffisante de visites techniques et autres présentant un intérêt
- iv) exprimé la volonté de se conformer aux règles de la Conférence établie par le Comité Exécutif.

#### 16. Programme

The general principles for the procedure to be followed at an International Conference shall be decided upon by the Executive Committee or by the Officers if the Executive Committee is not yet to meet, having received a report from the Conference Procedure Committee set up for this purpose and appointed at the previous Conference. The detailed arrangements shall be the responsibility of the Organising Committee of the host country, in consultation with the President and Secretary General.

Une invitation émanant d'un pays qui imposerait des restrictions pour des raisons de nationalité, race, religion, ou politique, ne serait pas considérée comme acceptable. Si plusieurs Sociétés nationales se proposent le choix sera faite au scrutin secret.

#### 16. Programme

Les directives générales relatives à l'organisation d'une Conférence internationale seront arrêtées par le Comité Exécutif sur rapport du Comité spécial nommé à la Conférence précédente, et établi dans ce but ou par les Responsables, si le Comité Exécutif ne doit pas se réunir. La responsabilité des dispositions de détails appartient au Comité d'organisation du pays invitant, en accord avec le Président et le Secrétaire Général.

#### 17. Membership

These conferences are intended for members of the International Society and their ladies only. Other persons wishing to attend must obtain the permission of the National Society in their country of residence, or of the Secretary General.

#### 17. Participation

Ces conférences sont destinées aux membres de la Société internationale et à leurs épouses uniquement. Les autres personnes souhaitant participer devront obtenir la permission de la Société nationale de leur pays de résidence ou du Secrétaire Général.

#### TECHNICAL SUB-COMMITTEES

18. Technical Sub-Committees appointed by the Executive Committee shall report to the Executive Committee at the time of the next International Conference.

#### SOUS-COMITES TECHNIQUES

18. Les Sous-comités Techniques nommés par le Comité Exécutif devront présenter leurs rapports au Comité Exécutif lors de la Conférence internationale suivante.

#### SUBSCRIPTIONS

19. Each National Society shall pay to the order of the Society its subscription annually in advance on 1st January each year. From 1st January 1966 the amount was fixed by the Executive Committee (meeting at Montreal in 1965) at \$25.00 (U.S.) per National Committee, plus \$ 0.75 (U.S.) per individual member.

#### COTISATIONS

19. Chaque Société nationale versera à l'ordre de la Société sa cotisation annuelle le 1er Janvier de chaque année. A compter du 1-1-1966, le montant a été fixé par le Comité Exécutif (réunion de MONTREAL en 1965) à :  
\$ 25.00 (E. U. A.)  
par Comité National  
majorés de: \$ 0.75 (E. U. A.)  
Par membre individuel

At any time the basis of subscriptions shall be that agreed by the most recent meeting of the Executive Committee, the number of members in the National Society

A toute époque la cotisation sera celle adoptée par la plus récente réunion du Comité Exécutif, le nombre des membres de la Société nationale étant celui de la date du paiement.

being that at the time the payment is due. The Executive Committee shall have a financial report at each meeting and shall regularly review the amount of the subscription.

Il sera présenté un rapport financier à chaque réunion du Comité Exécutif. Le montant de la cotisation sera revu à cette occasion.

## LIST OF MEMBERS

20. About 18 months before an International Conference, no later than a date specified by the Secretary General, each National Society shall send to him the current list of its members, with their addresses and occupations, and the permanent address of its Secretary. The lists are to be typed in accordance with instructions issued at the time by the Secretary General, the instructions for the 1968 list being as given in Appendix B. The Secretary General will then distribute to each National Society a sufficient number of bound copies of the complete list of members for each individual to have one if he so chooses. A National Society which has allowed its membership to lapse will not be included in the list.

The current Constitution and By-Laws shall be included with the published list of members.

### ANNEX A

List of National Societies within the various geographical zones at January 1, 1969

#### Europe

Austria  
Belgium  
Bulgaria  
Czechoslovakia  
Denmark  
Finland  
France  
Germany (W)  
Greece  
Hungary  
Ireland  
Italy  
Netherlands  
Norway  
Poland  
Portugal  
Spain  
Sweden  
Switzerland  
Turkey  
United Kingdom  
U.S.S.R.  
Yugoslavia

#### Asia

China (People's Republic)

India  
Israel  
Japan  
S.E. Asia

#### North America

Canada  
Mexico  
U.S.A.

#### South America

Argentine  
Brazil  
Colombia  
Ecuador  
Peru  
Venezuela

#### Africa

Morocco  
Rhodesia  
South Africa

#### Australasia

Australia  
New Zealand

## LISTE DES MEMBRES

20. Environ dix huit mois avant une Conférence Internationale, et au plus tard à une date spécifiée par le Secrétaire Général, chaque Société nationale devra lui envoyer la liste mise à jour de ses membres avec leurs adresses et leurs professions, ainsi que l'adresse permanente de son Secrétaire. Les listes doivent être dactylographiées, conformément aux instructions établies en temps utile par le Secrétaire Général, les instructions pour la liste 1968 étant celles qui sont données dans l'annexe B. Le Secrétaire Général diffusera ensuite à chaque Société nationale un nombre de jeux, de la liste complète des membres, correspondant au nombre d'adhérents. Une Société nationale qui a laissé se périmer sa participation ne figurera pas sur la liste.

Les Statuts en vigueur et le Règlement Intérieur seront inclus dans la liste des membres publiée.

### A N N E X E A

Liste des Sociétés nationales à l'intérieur des zones géographiques au 1er Janvier 1969

#### EUROPE

Autriche  
Belgique  
Bulgarie  
Tchécoslovaquie  
Danemark  
Finlande  
France  
Allemagne de l'Ouest  
Grèce  
Hongrie  
Irlande  
Hollande  
Italie  
Norvège  
Pologne  
Portugal  
Espagne  
Suède  
Suisse  
Turquie  
Royaume-Uni  
U.R.S.S.  
Yougoslavie

#### ASIE

Chine Populaire  
Indes  
Israël  
Japon  
Asie du Sud-Est

#### AMERIQUE DU NORD

Canada  
Mexique  
E. U. A.

#### AMERIQUE DU SUD

Argentine  
Brésil  
Colombie  
Equateur  
Pérou  
Vénézuéla

#### AFRIQUE

Maroc  
Rhodésie  
Afrique du Sud

#### AUSTRALASIE

Australie  
Nouvelle Zélande

ANNEX B

PREPARATION OF LIST OF MEMBERS  
1968

INSTRUCTIONS TO NATIONAL SOCIETIES AND  
TYPISTS

Your manuscript will be photographed and reduced by 25%. It is therefore essential that the following instructions are followed:

- i) Use preferably (but not essentially) an electric typewriter. Type face MUST BE 'Elite' (i.e., the same size as this)
- ii) Use a one-only very black ribbon;
- iii) Make sure that the type-face is clean;
- iv) Supply one carbon copy on flimsy paper;
- v) Type the names of your members in strict alphabetical order; lists should be checked carefully. Any corrections which show up on the manuscript will also show when the pages are photographed.

Type on one side only of the special MS paper provided: type in single spacing, in three columns, keeping within the outside blue lines, as on the enclosed sample, copied from your entry in the 1964 list of members.

**Appendix D Report on Activities of Asian Region 1965-1969**

1. COUNTRY

Southeast Asia

2. NAME OF SOCIETY

Southeast Asian Society of Soil Engineering

3. OFFICERS OF THE SOCIETY

Dr. Za-Chieh Moh, President  
Dr. John D. Nelson, Secretary-Treasurer

Committee Members: Mr. Khaja Azeemuddin,  
Dr. Sirilak Chaudraugsu, Mr. Bun Don,  
Prof. Sean Mackey, Prof. Chin Fun Kee,  
Mr. José C. Santos, Mr. Chau Chee Wah.

A N N E X E B

Préparation de la liste des MEMBRES 1968.

Instructions aux Sociétés Nationales  
et aux dactylographes

-----  
Votre texte doit être photographié et réduit de 25%. C'est pourquoi il est essentiel que les instructions suivantes soient suivies.

- i) Utiliser de préférence (mais non obligatoirement) une machine à écrire électrique "Elite" (c'est-à-dire celle utilisée dans ce texte)
- ii) N'utilisez qu'une seule fois un ruban très noir
- iii) Assurez-vous que les caractères sont propres
- iv) Fournir une copie carbone sur pelure fine
- v) Dactylographier les noms de vos membres par ordre alphabétique rigoureux; les listes doivent être vérifiées soigneusement. Toute correction apparaîtra également quand les pages seront photographiées.

Ne taper que sur un côté du papier spécial MS qui vous sera fourni, et taper à intervalles les simples sur trois colonnes en restant entre les lignes bleues extérieures comme sur les spécimens ci-joint reproduit depuis votre inscription sur la liste des membres en 1964.

**Appendix D Rapport sur les Activités en Asie 1965-1969**

4. APPROXIMATE NUMBER OF MEMBERS

(Malaysia, Singapore, Thailand,  
240) Hongkong, Philippines, Viet Nam,  
(Taiwan, Pakistan, Papua.

5. MEETINGS OR CONFERENCES

- a. Without published proceedings
- b. With published proceedings

"Southeast Asian Regional Conference of Soil Engineering", 1967 at Bangkok, sponsored by Asian Institute of Technology, ASCE, Inst. of C. E. (U.K.), Engineering Institute of Thailand. In English, Cost \$20.00, available from Dr. Za-Chieh Moh, Asian Institute of Technology.

ANNEX B

PREPARATION OF LIST OF MEMBERS  
1968

INSTRUCTIONS TO NATIONAL SOCIETIES AND  
TYPISTS

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(Taiwan, Pakistan, Papua.

5. MEETINGS OR CONFERENCES

- a. Without published proceedings
- b. With published proceedings

"Southeast Asian Regional Conference of Soil Engineering", 1967 at Bangkok, sponsored by Asian Institute of Technology, ASCE, Inst. of C. E. (U.K.), Engineering Institute of Thailand. In English, Cost \$20.00, available from Dr. Za-Chieh Moh, Asian Institute of Technology.

"Specialty Session on Engineering Properties of Lateritic Soils", Mexico City, 1969, sponsored by Asian Institute of Technology, International Society of SMFE, Cost \$25.00 (two volumes), available from Dr. Za-Chieh Moh.

(\$15.00 for two volumes, from SARITA PRAKASHAN, NAUCHANDI GROUNDS, MEERUT (U.P.) India)

3) Symposium on Black Cotton Soils, held by College of Military Engineering, Poona, India, May 1969.

6. BULLETIN, NEW MAGAZINE, PROCEEDINGS OR OTHER PUBLICATIONS

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"Journal of the Southeast Asian Society of Soil Engineering" to be published 1969 by Asian Institute of Technology and Southeast Asian Society of Soil Engineering. Two issues per year, English, \$3.00. Order from Secretary, Southeast Asian Society.

Journal of the National Society, 4 issues per year; in English, to be ordered from National Society. Subscription \$4.00 per year. Order from Secretary, National Society, Curzon Road, Barracks, New Delhi, 1

7. SPECIAL ACTIVITIES AND REMARKS

1. COUNTRY

1. COUNTRY

India

Israel

2. NAME OF SOCIETY

2. NAME OF SOCIETY

Indian National Society of Soil Mechanics and Foundation Engineering

Israel Society of Soil Mechanics and Foundation Engineering

3. OFFICERS OF THE SOCIETY

President, Professor Dinesh Mohan,  
Prof. N. S. Gorinda Rao  
Dr. Jagdish Narain

Members, Dr. S. Prakash  
Prof. B. V. Rangaathan  
Dr. V. J. Patel

Secretary, Shi S. N. Gupta

3. OFFICERS OF THE SOCIETY

President, J. G. Zeitlen  
V. President, I. Alpan  
Honorary Secretary, E. Zolkov

Executive Committee Members:  
G. Wiseman, A. Komornik,  
G. Kassif, B. Aisenstein,  
Y. Amir, M. Katzir, D. David

4. APPROXIMATE NUMBER OF MEMBERS

848 members

4. APPROXIMATE NUMBER OF MEMBERS

95 members

5. MEETINGS OR CONFERENCES:

- a. Without published proceedings
- b. With published proceedings

1) Symposium on Pore Pressure and Shearing Strength of Soils, New Delhi, 1967.

2) Symposium on Earth and Rockfill Dams, Beas Dam Site, Tahoara, Sept. 1968

5. MEETINGS OR CONFERENCES.

- a. Without published proceedings

Eight various specialty meetings, in Hebrew, on building foundations, road problems, piles, etc.

- b. With published proceedings

Third Asian Regional Conference on Soil Mechanics and Foundation Engineering, Haifa, 1967.

Proceedings available from Dr. G. Kassif, Israel Institute of Technology. \$30.00 for two volumes.

6. BULLETIN, NEWS MAGAZINE, PROCEEDINGS OR OTHER PUBLICATIONS

A Society Journal is in the course of preparation.

## 7. SPECIAL ACTIVITIES AND REMARKS

Cooperation with various bodies as the Association of Engineers and Architects in Israel and Israel Standards Institute; helped prepare Code of Practice for Building Foundations.

### 1. COUNTRY

Japan

### 2. NAME OF SOCIETY

The Japanese Society of Soil Mechanics and Foundation Engineering

### 3. OFFICERS OF THE SOCIETY

President, Toshisada NAITO  
V. President, Masami FUOKOKA  
V. President, Hisao NAGAI  
Secretary, Hiroshi MORI

### 4. APPROXIMATE NUMBER OF MEMBERS

8,000 local members  
168 international members

Appendix E Vice-President's Report on Australasian Regional Activities  
1965-1969

Mr. President, Gentlemen,

It is my pleasure and privilege to present to you a brief account of the activities that have taken place in our National Societies of New Zealand and Australia since the last meeting of the Executive Committee in Montreal in 1965.

#### 1. 5th AUSTRALIAN-NEW ZEALAND CONFERENCE ON SOIL MECHANICS AND FOUNDATION ENGINEERING 1967.

This, our Fifth Regional Conference and undoubtedly the most significant activity during the period under review, was held at Auckland during February 1967. The joint hosts were the University of Auckland and the New Zealand Institution of Engineers who catered for over 200 delegates and associates.

Professor P. W. Rowe was guest lecturer at the conference and addressed delegates on the role of anisotropic fluid flow in the stability of soil structures.

A full account of the conference is given in the published proceedings which are available from the New Zealand Institution of Engineers or the Institution of Engineers, Australia.

## 5. MEETINGS OR CONFERENCES:

- a. Without published proceedings
- b. With published proceedings

Still available "Proceedings of Second Asian Regional Conference on Soil Mechanics and Foundation Engineering"  
\$20.00, from Japanese Society

Annual meetings, plus one or two specialty meetings each year, published in Japanese.

## 6. BULLETIN, NEWS MAGAZINE, PROCEEDINGS OR OTHER PUBLICATIONS

"Soils and Foundations" by the Japanese Society, 6 issues per year in English; 12 issues per year in Japanese.  
\$ 5.00 per year for English journal.

## 7. SPECIAL ACTIVITIES AND REMARKS

Special publications: (in Japanese)  
J. I. S. (Japan Industrial Standard)  
Sampling Manual  
Manual for Soil Testing  
Manual for Site Investigation

Appendice E Rapport du Vice-Président sur les Activités en Australasie  
1965-1969

## 2. THE AUSTRALIAN GEOMECHANICS SOCIETY

The most pleasing development during my term of office has been the agreement reached to establish an Australian Geomechanics Society from January 1st. 1970.

This Society will be sponsored by the Institution of Engineers, Australia, and the Australasian Institute of Mining and Metallurgy and will coordinate the activities of the National Societies of Soil Mechanics and Foundation Engineering and of Rock Mechanics. It will also sponsor the publication of an Australian Geomechanics Journal, the first issue of which is scheduled to appear in mid-1970. Together with members of the engineering geology profession it is anticipated that active membership of the new society will total 400-450.

## 3. PROFESSIONAL ACTIVITIES

In Australia and in New Zealand there has been increasing activity at a national level in the holding of specialist symposia and participation in the preparation of specifications for methods of test and codes of engineering practice.



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## 3. PROFESSIONAL ACTIVITIES

In Australia and in New Zealand there has been increasing activity at a national level in the holding of specialist symposia and participation in the preparation of specifications for methods of test and codes of engineering practice.

It is now apparent that annual specialist symposia supplemented by more frequent local group meetings have become well established. The symposia generally take the form of two- or three day meetings covering a single topic. Those held or scheduled in the period under review were:

#### NEW ZEALAND

"Roading Earthworks"                      Auckland,  
August 1965

"Site Investigations"                      Christchurch,  
August 1965

#### AUSTRALIA

"Site Investigations"                      Sydney,  
November 1966

"Field Measurements"  
(in conjunction with  
Australian Road Research  
Board Conference).                      Melbourne,  
August 1968

"Rock Mechanics"  
(in conjunction with the  
Australasian  
Institute of Mining and  
Metallurgy).                      Sydney,  
January 1969

Both National Societies have been actively engaged in preparation of specifications for methods of test of soils for engineering purposes. It is interesting to note that

both countries have started from the British Standard Specification 1377:1961 but have found it necessary to modify the procedures to suit local conditions. It is quite apparent that local soil conditions and geology continue to play a very important part in engineering works.

The New Zealand National Committee has also been active in preparing a draft Code of Practice for "Compaction of Land for Housing" and also in preparing a Site Building Register.

The Australian National Committee, acting on behalf of the Standards Association of Australia has prepared a draft Code of Practice for "Site Investigation".

(Further details of these activities may be obtained from the National Society of the country concerned).

#### 4. MEMBERSHIP

During the period under review the New Zealand Society membership increased from 57 to 133.

The Australian membership decreased from 406 to 331. This decrease is primarily attributed to the introduction in 1967 of a nominal annual capitation fee when membership fell to below 300 but has since recovered to its present level. As noted above it is expected the number will rise with the addition of 100-120 mining engineers and engineering geologists to the Australian Geomechanics Society.

#### Appendix F Report on Activities in African Region 1965-1969

#### Appendice F Rapport sur les Activités en Afrique 1965-1969

Africa is a large region with only 3 National Societies, South Africa and Rhodesia in the South and Morocco in the North. In addition, regional branches of the Portuguese National Society exist in the Provinces of Angola and Mozambique. Communications between many groups within the region is thus complicated by distance and it is only through a perusal of published literature that a fuller picture of the overall activities in the region can be gained. While therefore this report is concerned mainly with the Southern half of Africa, it is evident from the papers accepted for the 7th ICOSOMEF that valuable research work is being done in Ghana and Egypt, neither of which countries have National Societies.

During the period under review, many symposia and short courses on various aspects of Soil Mechanics and Foundation Engineering have been held, particularly in South Africa but the highlight of the period was undoubtedly the Fourth Regional Conference for Africa, held in Cape Town in December, 1967. The theme of the Conference was "Soil Forming Processes and Associated Engineering Problems" a theme of great importance in this region where the bulk of our problems are associated with residual

soils as opposed to the classical thick depositional clays of Europe and North America. Papers were presented under the five headings of:

- Terrains Evaluation
- Pedogenic Materials
- Residual and Transported Soils
- Highways
- General Topics

and attracted considerable attention, both from within the region and overseas.

The key note address was delivered by Dr. G. D. Aitchison of Australia and an interesting specialty lecture delivered by E. D'Appolonia of the U.S.A. Overseas delegates came from the United Kingdom, Australia, the U.S.A., France, Brazil and Portugal while the region was well represented by delegatee from Angola, Botswana, Malawi, Mozambique, Rhodesia, South West Africa and the host country, South Africa. Volume I of the Proceedings contained the formal papers, Volume II the discussion and reports of specialty sessions and Volume III, authors replies to discussions. No formal papers were read, morning sessions being de-

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**Appendix G Vice-President's Report on North America Activities  
1965-1969**

**INTRODUCTION**

Early in 1966 considerable correspondence began with President Bjerrum, the Secretary General, the Mexican Organizing Committee, the National Committees of Canada, Mexico and the United States and various individuals in North America interested in arrangements for the VII Congress. I shall mention only a few of the more pertinent items of this correspondence.

**PERTINENT CORRESPONDENCE**

The Third Pan-American Conference was held in Caracas, Venezuela in July, 1967. Subsequent to this Conference correspondence was initiated between Vice-President Moretto of South America, the United States National Committee and myself. The results were that San Juan, Puerto Rico was selected as the site for the Fourth Pan American Conference to be held in 1971. The United States proceeded to issue an invitation to the Secretary General for the International Executive Committee to hold its two year interim meeting at San Juan, in 1971.

I had considerable correspondence with numerous North American engineers concerning the invitational Conference on the Shear Strength of Natural Soils and Rocks held at Oslo, Norway in Sept. 1967. In all, 14 North Americans attended this Conference.

In late 1966 and early 1967, I contacted the National Committees concerning the organization of an International Research Center.

Primarily because of cost the North American National Committees were negative to such an organization.

Early in 1967 heavy correspondence began concerning numerous proposed Specialty Conferences to be held at the VII Congress in Mexico City. I was able to assist in the coordination of several of these.

Some confusion developed in organizing the Second International Conference on Clay Soils to be held at Texas A&M University, College Station, Texas, during the week prior to the VII Congress in Mexico City. It was agreed that the Conference would be held at Texas A & M University, but that there would be one Specialty Session at Mexico City on the same subject matter. At the Specialty Session, Prof. Zeitlen would report the results of the Texas A & M Conference with Prof. Jennings presiding. I was present at the Texas A & M

At the conclusion of the Conference, the invitation to hold the 5th Regional Conference in Luanda, Angola in 1971 was unanimously accepted as was the election of Eng. Manuel P. Dos Santos, Minister of Public Works for Overseas Provinces, or Portugal as the incoming Vice-President.

**Appendix G Rapport du Vice-Président sur les Activités en Amérique  
du Nord 1965-1969**

Conference and can report that the Conference was quite successful and instructive. In all about 190 engineers were present from eleven different countries. Reports from the A & M Conference should insure the success of the Specialty Session at Mexico City.

In November 1967 correspondence was initiated between Dr. Moretto and myself concerning the organization of National Committees in the several Central American Countries. While these countries are a part of North America there exists a language barrier.

This barrier was no problem to Dr. Moretto and in addition he was much more familiar with engineering organizations in these countries than I; in consequence, I suggested to Dr. Moretto that he proceed to help these countries organize National Committees so that if they desired they could later become affiliated with the International Society. I told Dr. Moretto that the other North American National Committees and I would help in any way that we could. It was tentatively agreed between Dr. Moretto and myself that a Central American National Committee, upon being admitted a member of the International Society, could become affiliated with either North or South America according to its desires. Dr. Moretto has had a considerable degree of success in his efforts and he will report upon this in greater detail. We agreed that the Central American problem should be placed on the agenda of the Executive Committee meeting in Mexico City.

In May 1968 the paper quotas between Canada, Mexico and the United States were agreed upon and this information was furnished to the Mexican Organizing Committee and the Secretary General.

As Vice President I was asked to coordinate North American papers to be submitted to the International Symposium on Land Subsidence to be held in Tokyo, Japan in Sept. 1969. I asked the North American National Committees to assist and in all 22 papers have been accepted for the Conference. Undoubtedly a good representation from North America will attend the Conference.

At the request of the Secretary General early in 1969, I checked into the matter of the next Vice President for North America. I found that a rotation system was being followed between the three countries of North America and that Canada was entitled to the next Vice

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President. The Canadian National Committee was contacted and asked to choose an engineer for Vice President and communicate this information to the Secretary General. Dr. D. H. MacDonald was chosen.

In the early Spring of 1969 the Secretary General furnished me a copy of a proposed Constitution and By-laws for the Society and asked that if I had any corrections they be furnished him at an early date; this was done.

#### NATIONAL COMMITTEE ACTIVITIES

<u>Conference</u>	<u>Place</u>	<u>Date</u>	<u>Theme</u>
Twelfth Muskeg Research Conference	Calgary	19-20 May 1966	Environmental Analysis; Access and Terradynamics; Exploitation
Nineteenth Canadian Soil Mechanics Conference	Vancouver	6-8 October 1966	Earth Dams
Conference on Ice Pressures Against Structures	Quebec	10-11 November 1966	Action of Ice on Engineering Structures
Twentieth Canadian Soil Mechanics Conference	Quebec	14-15 September 1967	Shear Strength and Consolidation of Sensitive Clay
Twenty-First Canadian Soil Mechanics Conference	Winnipeg	12-13 September 1968	Structure Performance Related to Soil Environment
Third Canadian Conference on Permafrost	Calgary	14-15 January 1969	Permafrost Problems Related to Mining and Oil and Gas Production Industries

#### UNITED STATES NATIONAL COMMITTEE

Conferences, seminars and symposia held in the United States since 1965 are listed below:

1. Lecture series: Foundations in Variable Soils, University of Wisconsin, Oct. 13, 1965, Nov. 10, 1965, Jan. 12, 1966, Feb. 9, 1966.
2. Lecture series on the Design and Construction of Earth Structures, Chicago, Feb. 16, Mar. 9, Mar. 30, April 20, May 11, 1966.
3. Seminar in Problems in the Evaluation of Pile Foundations, Metropolitan (New York) Section, ASCE, April 12-13, May 10-11, 1966.
4. Third Annual Symposium on Oil Shale, Denver, April 14-15, 1966.
5. First International Conference on Marine Geotechnique, University of Illinois, May 1-4 1966.

In the following paragraphs I shall briefly describe the activities of the three National Committees.

#### CANADIAN NATIONAL COMMITTEE

The table below illustrates the activities in Canada since 1965. It will be noted that the three National Conferences in Soil Mechanics have been published in the Canadian Geotechnical Journal and the Proceedings of the other Conferences are issued as technical memoranda of the Associate Committee on Geotechnical Research.

6. Seminar on Hillside Development, Los Angeles Section, ASCE, May 11, 1966.

7. ASCE Water Resources Engineering Conference, Denver, May 16-20, 1966: sessions on Earth and Rockfill Dams, Shale Pipe Installation and Backfill Procedures, Rock Mechanics.

8. Program on Geological Engineering, University of California at Berkeley, August 15-20, 1966.

9. ASCE Specialty Conference on Stability and Performance of Slopes and Embankments, Berkeley, August 22-26, 1966.

10. Conference on Earth Embankments and Backfill Adjacent to Structures, Montana State University and Montana Section, ASCE, Nov. 4-5, 1966.

11. Second Annual American Water Resources Conference, Chicago, Nov. 20-22, 1966.

12. Fourth Paving Conference, University of New Mexico, Dec. 8-9, 1966.

13. Seminar Series, Pittsburgh Section, ASCE, 4 seminars, Feb., Mar., 1967: sessions on Shallow Foundations, Foundations in Deep Excavations, Deep Foundations, Geologic Aspects of Foundation Engineering.

14. Fourth Annual Symposium on Oil Shale, Denver, April 6-7, 1967.

15. Seminar on Construction Dewatering and Pressure-Relief Techniques, Metropolitan (New York) Section, ASCE, Apr. 11-12, and May 9-10, 1967.

16. Eighteenth Annual Highway Geology Symposium, Purdue University and Indiana State Highway Commission, April 20-21, 1967.

17. ASCE Structural Engineering Conference, Seattle, May 8-12, 1967: Sessions on Foundations, Grouting, and Permafrost.

18. ASCE Seminar on Seismic Design, Seattle, May 12-13, 1967.

19. Symposium on Wave Propagation and Dynamic Properties of Earth Materials, ASCE and University of New Mexico, August 23-25, 1967.

20. Course on Finite Element Methods in Soil Mechanics, M.I.T., August 28- Sept. 1, 1967.

21. Joint Soil Mechanics Colloquium, Chicago, Oct. 4 and Nov. 8, 1967, Mar. 4, April 15 and 24, and May 2 and 22, 1968.

22. Soil and Foundation Seminar, National Capital Section, ASCE, Jan. 23, 1968, Feb. 6-27, 1968.

23. Symposium on Stress-Deformation-Pore Pressure Behavior of Soils, Cornell University, Jan. 25-26, 1968.

24. State-of-the Art Symposium on Earthquake Engineering of Buildings, San Francisco, Feb. 5-6, 1968.

25. Course on Recent Developments in the Design and Construction of Earth and Rockfill Dams, University of California at Berkeley, Mar. 18-23, 1968.

26. Course on Vibrations of Soils and Foundations, University of Michigan, June 3-14, 1968.

27. Course on Recent Advances in Soil Mechanics, UCLA, June 10-14, 1968.

28. Symposium on Deep Foundations, ASTM Annual Meeting, San Francisco, June 24, 1968.

29. Symposium on Earthquake and Vibration Effects on Soils, ASTM Annual Meeting, San Francisco, June 25, 1968.

30. ASCE Specialty Conference on Placement and Improvement of Soil to Support Structures, M. I. T., August 26-28, 1968.

31. Session on Testing Soils at High Pressure, ASTM Annual Meeting, Atlanta, Sept. 29- Oct. 4, 1968.

32. Symposium on Effects of Temperature and Heat on the Engineering Behavior of Soil, Highway Research Board Meeting, Jan. 1969.

33. ASCE National Meeting on Water Resources Engineering, New Orleans, Feb. 3-7, 1969: Sessions on Grouting, Engineering Geology, Earth Dams, Soil Mechanics Research, and Deep Foundations and Retaining Structures.

34. Seventh Annual Symposium on Engineering Geology and Soils Engineering, University of Idaho, April 9-11, 1969.

35. Course on Prediction and Measurement of Stresses and Deformations in Soils, M.I.T., August 18-22, 1969.

It will be noted that the American Society of Civil Engineers (ASCE), the Highway Research Board (HRB), the American Society of Testing Materials (ASTM), Universities and other groups have contributed in the soil mechanics field. All papers are documented in Proceedings of the Society involved or in the publication of individual symposia or papers. The following is a tabular grouping of the conferences.

ORGANIZATION	NO OF CONFERENCES
University Short Courses	15
Seminars and Symposia by ASCE and other groups	12
National Specialty Conferences, Soil Mechanics & Foundation Division, ASCE	2
ASCE National Conferences with Soil Mechanics Sessions	3
ASTM Annual Meetings with Soil Mechanics Sessions	3

Attention is directed to items 9 and 30 in the tabulated list. These are three to four day conferences devoted entirely to soil mechanics papers and discussions and are sponsored by the Soil Mechanics and Foundation Division (SMFD) Executive Committee, ASCE. All the papers of these two Specialty Conferences as well as all soil mechanics papers of the ASCE National Conferences are published in the Soil Mechanics and Foundations Division Journal, ASCE. This Journal is published at two-month intervals.

The following are some further activities of the Soil Mechanics and Foundations Division Executive Committee, which also serves as the United States National Committee:

1. Established International Abstracts Section in SMFD Journal.
2. Cooperation with Germany in establishing International Geotechnical Abstracts.
3. Established Research Council on Expansive Soils.

4. Cooperation with Construction Division ASCE in establishing Council on Rapid Tunneling.

The SMFD has the following active sub-committees:

1. Awards
2. Continuing Education
3. Publications
4. Definition of Standards
5. Research
6. Sessions Program Planning
7. Computer Applications
8. Deep Foundations
9. Retaining Structures
10. Embankment Dams and Slopes
11. Engineering Geology
12. Grouting
13. Information Retrieval
14. Performance of Earth Supported Structures
15. Rock Mechanics
16. Soil Dynamics
17. Soil Properties
18. Placement and Improvement of Soils.

The above committees are responsible for preparing papers on the various subject matter. Some special reports are published as illustrated by the following.

1. Special volume on Information Retrieval, in September 1967 Journal.
2. Special report on Continuing Education
3. Special report on Consulting Practice

A Terzaghi Lecture is presented annually by a distinguished member of the soil mechanics profession as a special highlight of the Annual ASCE Meeting. The SMFD also cooperates with other groups in supporting special conferences on soil mechanics.

#### MEXICAN NATIONAL COMMITTEE

The following is a report of the Mexican Society of Soil Mechanics.

The Officers of the Society as of 1969 until 1970 are:

Dr. R. J. Marsal	President
Mr. C. L. Flamand	Vice President
Mr. E. Soto	Secretary
Mr. M. Rufiz	Treasurer

The approximate number of members: 189; an increase in membership of approximately 50% related to the last period.

The meetings or conferences, with full or partial sponsorship of the Society were:

1. The First International Conference on Deep Foundations was held in November 1964. The Mexican Society had in this case the collaboration of the A.S.C.E. and the Committee D-18 of the A.S.T.M. Proceedings are still available at \$16.00 (two volumes), in English and Spanish.

2. The VII International Conference on Soil Mechanics and Foundation Engineering.- August 1969. Proceedings are available at a cost of \$40.00, including surface postage charges.

A bi-monthly bulletin in Spanish with the Society's activities is distributed among the members and is also sent to all the National Societies. This bulletin was first published in 1969.

Special Activities consisted of a plan of Soil Mechanics' Lectures which has been developed during the 1969 class period at the State Universities.

At present, a review and up to date version of the Society's Statutes is being developed.

In addition to the above the Mexican Society has had the continuous burden of assisting in organizing the VII Congress; in this they deserve all our congratulations.

#### Appendix H Vice-President's Report on South America

#### Appendix H Rapport du Vice-Président en Amérique du Sud

The Panamerican Congress which is now held every four years in between International Conferences as a joint venture of the North and South American zones is considered by South America as the most important event of its own region.

In 1967, the Third Panamerican Congress was held in Caracas, Venezuela, with the Sociedad Venezolana de Mecánica de Suelos e Ingeniería de Fundaciones acting as organizer and host. It was an extremely successful conference and their Proceedings were published in three volumes written in English and Spanish. They are on sale at the Venezuelan Society of Soil Mechanics mentioned above and were advertised in various sources including the news sections of Geotechnique and the A.S.C.E. Soils Division. The Congress covered the following subjects:

Division I Physical and Chemical Properties of the Soils, Field and Laboratory Investigations.

Division II Shallow Foundations. Deep Foundations without the Use of Piles. Pile Foundations. Others.

Division III Earth and Rock-fill Dams. Earth and Rocks Structures other than Dams, Highways and Airports. Open Excavations. Applied Geology.

Division IV Earth Pressure. Retaining Walls. Sheet Piling.

Division V The Evaluation of Soil Mechanics in America. Census of Research Centers and their Programs. The Teaching of Soil Mechanics in America.



4. Cooperation with Construction Division ASCE in establishing Council on Rapid Tunneling.

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Division IV Earth Pressure. Retaining Walls. Sheet Piling.

Division V The Evaluation of Soil Mechanics in America. Census of Research Centers and their Programs. The Teaching of Soil Mechanics in America.

The next Panamerican Congress will be organized by the U. S. Soil Mechanics Committee under the auspices of the A.S.C.E. and will be held in San Juan, Puerto Rico in 1971.

Prior to the Conference a one-week Panamerican course on soil mechanics was held at the Universidad Católica Andrés Bello, during which the following subjects were covered: "Behaviour of saturated clays", "Engineering Geology Applied to Dams", "Behaviour of Granular Soils", and "Criteria in the Design of Foundation". Notes were provided by the lecturers and made available to all participants to the Congress.

Three of the National Societies in the region held conferences in their own countries with a few participants from neighboring nations.

Brazil held its Third Congress on Soil Mechanics in Belo Horizonte in July 1966 during which the following topics were considered:

1. PROPERTIES OF SOILS.- Comparison between laboratory tests and observation of real structures
2. TEACHING AND RESEARCH.- Post graduate courses in Brazil
3. DIRECT FOUNDATIONS.- Allowable stresses through different correlations
4. DEEP FOUNDATIONS.- Problems in the execution of deep foundations
5. EARTH AND ROCKFILL DAMS AND THEIR FOUNDATIONS.- Treatment of dam foundations
6. EARTH PRESSURE IN TEMPORARY AND PERMANENT SUPPORTS.- Stability of slopes
7. HIGHWAYS.- Pavement behaviour as function of design
8. ROCK MECHANICS.- Rock excavation with explosives and its problems.

Ecuador had its First Soil Mechanics Conference held in Guayaquil in November 1967 during which the following subjects were discussed:

Division I Physical and mechanical properties of soils.- Laboratory and field investigations

Division II Spread and deep foundations

Division III Highways and Airports

Division IV Earth Dams - Earth pressures-Retaining walls

Division V Evaluation of soil mechanics in Ecuador

Argentina for its part had its first meeting in July, 1968, held at La Plata at the L.E.M. I.T. laboratory. The following subjects were discussed:

I - Physical and mechanical properties of soil

II- Experiences with local soils

III- Foundations

IV - Earth Dams

After the meeting an accelerated course on earth dam engineering was given at the Engineering School of the University of Litoral in Rosario. This lecture course, which was attended by over 100 people was given by three specialists from Argentina and Brazil.

The Venezuelan Society on Soil Mechanics has continued to publish its quarterly bulletin. This is directed towards readers in all Spanish speaking countries and others are warmly invited to subscribe to it. Publications in English and French are contemplated and papers in these languages are also welcome.

By suggestion of the Mexican Committee in agreement with the Vice-President for North America and with approval of the President of the International Society, the Vice-President for South America undertook a drive to promote the formation of new national committees in Central America and in those countries of South America that are not members of the International Society. For that purpose a letter was sent to fifteen national organizations belonging to the Panamerican Union of Engineers stating the purpose of our Society, pointing out the benefits that can be derived from affiliation and inviting them to establish a local committee in keeping with the statutes of the International Society.

A copy of the statutes was enclosed and suggestions were made about two possible types of committees: a national, attached to the local engineers organization, like the U.S. National Committee, or an independent society, like those of Argentina, Brazil, Mexico, etc.

At first, the response was not encouraging. However, some personal contacts showed that it was not because of lack of interest. There were difficulties to get through all the formalities necessary to set a permanent committee. Therefore, a new circular letter was mailed suggesting that interested engineers be grouped in a temporary association set up with the purpose of joining the International Society.

Three countries from South America have organized such groups. They are: Chile ( 9 members), Paraguay (5), & Uruguay (6). Four countries from Central America followed the same procedure. They are: Costa Rica (8), Guatemala (9), El Salvador (12) and República Dominicana (26).

The lists of members of the interested groups were sent to the Organizing Committee of the VII CIMSIC who included them in the mailing list for information regarding the Mexican Conference. It is to be expected that most of these countries will soon formally join the International Society.

The following are the names and addresses of the heading the above mentioned groups:

Chile:  
Fernando Martínez Serrano  
Fanor Velasco 13  
Santiago de Chile, CHILE

El Salvador:  
León Suncín Zelaya: Comité Nacional de Mecánica de Suelos.  
c/o Asociación Salvadoreña de Ingenieros y Arquitectos.  
Final 75a. Ave. Norte  
San Salvador, EL SALVADOR, C. A.

Costa Rica:  
Manrique Lara Tomas  
Apartado 2192  
San José de Costa Rica, C. A.

**Appendix I** Report on the Activities of the European National Societies 1965-1969

In May 1969 the European Region lost its Vice-President, Prof. Brinch Hansen, and his premature death has been a great loss to geotechnical science. As Vice-President for Europe of the International Society his influence and authority were very considerable.

The number of European National Societies has increased by one with the admission of Greece. The number of members of the European Societies has remained nearly constant, at about 4,500. However the membership of several countries has substantially increased, while for a few it has rather considerably decreased.

I have only little information concerning the normal activities of the national societies, although I know that most of them have regularly organized meetings in which particular subjects have been treated by national or foreign speakers.

Besides these normal activities several societies have taken special initiatives which are worthwhile mentioning in this report.

The first of these is the European Conference on the shear strength properties of natural soils and rocks organized by the Norwegian Society and held in Oslo in September 1967. The following topics were included: Shear Strength of Soft Clay; Shear Strength of Stiff Clay; Shear Strength of Soils other than Clay and Shear Strength of Rocks. The organization of this conference, which was attended by 330 persons, was remarkably fine and the Proceedings containing 609 pages, constitute a valuable document.

Guatemala:  
Emilio Beltranena Matheu  
20 Avenida "A" 0-06, Zona 15  
Guatemala, GUATEMALA, C. A.

Paraguay:  
Lorenzo Eugenio Codas  
Estados Unidos N° 785  
Asunción, PARAGUAY

Uruguay:  
Clara García Médici de Pérez  
Instituto de Estática Facultad de Ingeniería y Agrim.  
Herrera y Reissing 565  
Montevideo, URUGUAY

República Dominicana  
Jesús María Aquino  
Calle 37 Este Ens. Luperon  
Santo Domingo, REPUBLICA DOMINICANA

**Appendice I** Rapport sur les Activités des Sociétés Nationales du Europe 1965-1969

The British Society has continued with its Rankine Lectures. During the last four years the distinguished lecturers were: Professor A. W. Bishop, Dr. Laurits Bjerrum, R. Glossop and Professor R. B. Peck who respectively treated the following problems: "The strength of soils as engineering materials"; "Engineering Geology of normally consolidated marine clays as related to settlements of buildings"; "The rise of geotechnology and its influence on engineering practice"; "Advantages and limitations of the observational method in applied soil mechanics".

During May, 1969, the British Geotechnical Society also organized a conference on "In-Situ Investigations in Soils and Rocks".

The Journal "Geotechnique", which arose from the initiative of the British Society many years ago, has considerably grown in volume. In 1968 this publication contained more than 515 pages against 415 in 1965.

The Hungarian Society contributed at the organization of the Third Budapest Conference on Soil Mechanics and Foundation Engineering, which was held in October 1968. The topics of this conference were: "The physical characteristics of soils"; "Bracing and dewatering of foundation pits" and "Design of deep foundations". The reports have been published in a volume of 686 pages.

As in the past the German Society "Deutsche Gesellschaft für Erd-und Grundbau" organized its "Baugrundtagungen" which were respectively held at Munich in 1966 and

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As in the past the German Society "Deutsche Gesellschaft für Erd-und Grundbau" organized its "Baugrundtagungen" which were respectively held at Munich in 1966 and

Hamburg in 1968. The reports presented at these meetings have also been published. They always contain very valuable information for the profession.

The German Society is going on with its splendid initiative concerning the documentation abstracts (Dokumentation Uber Bodenmechanik und Grundbau). In 1965 the Swedish Geotechnical Institute submitted a proposal to publish a geotechnical abstracts journal. In 1967 the Swedish Geotechnical Institute found it necessary to withdraw its offer to publish this abstracts journal. An invitation has been extended to the German Society for Soil Mechanics to investigate the possibility of providing this service and the German Society kindly accepted the invitation. A proposal will be presented by the German Society for the publication of a journal called Geotechnical Abstracts. A specimen issue has already been presented to the members of the Executive Committee.

The French National Society organized in March 1968 a colloquium on Géotechnique at Toulouse. The topics were: "Determination in the laboratory of physical and mechanical properties of materials", "Determination in the laboratory of the alteration of materials"; "Formation of soils by alteration of rocks"; "Application to concrete of the methods used in mechanical studies of rocks and influence of the properties of the aggregates on the properties of concrete.

A Scandinavian Geotechnical Conference was held in Gothenburg, in September 1968, where 200 soils engineers from Denmark, Finland, Norway and Sweden gathered to discuss problems of special interest in the Scandinavian countries.

The Yugoslav National Society organized in September 1968 its Eleventh National Conference on Soil Mechanics and Foundation Engineering.

Under the influence of Prof. Tsytovich, a bi-monthly journal "Bases, Foundations and Soil Mechanics" is now published in Moscow. It is in Russian with an English translation of the list of contents.

The Swiss Society organizes in the spring and fall of every year meetings at which the members of the other European Societies are kindly invited. This Society published also a Lexicon of the technical terms utilized in Soil Mechanics and has brought out a new edition of the Proceedings of the Third International Conference at Zurich in 1953.

The Turkish National Committee organized a symposium on Soil Sampling and Field Tests in the spring 1969.

The Austrian National Society organized in Vienna in May 1968, the "Donau Europäische Konferenz" devoted to the theme "Soil Mechanics in Road Construction". The topics were "Foundations", "Settlement calculations",

"Pore pressures measurements", "Stability of slopes", "Stabilization of soils" and "Investigation concerning frost damage". The reports have been published in a volume of 274 pages. At that occasion the honorary degree of the Technische Hochschule of Vienna was conferred on Prof. Casagrande, who donated a bust of Prof. Terzaghi to the Institute.

In November of this year an international symposium on civil engineering structures on soils and rocks will be organized by the Academy of Sciences at the University of Sarajevo in Yugoslavia. The themes are as follows: "Experimental and theoretical investigations"; "Methods of calculation of pressure distributions"; "Practical applications".

The Czechoslovak Institute will organize in October of this year a conference on "New Advances in Soil Mechanics" on the occasion of the ceremonial unveiling of a memorial tablet on the house where Professor K. Terzaghi was born.

The International Society on Rock Mechanics was created in its present form at Lisbon in 1966. Although this society is different from our international society, it must be mentioned because the domains of both soil mechanics and rock mechanics overlap and many members of the International Society on Soil Mechanics are also members of the International Society on Rock Mechanics.

This gives rise to the problem of how best to organize at a national level both international societies. In several countries, for instance Belgium, Spain, France, Portugal, and Yugoslavia independent national societies on Rock Mechanics have been created. Other countries are still discussing the matter in view of finding the most adequate solution: Germany decided to have an overall group made up of four sections: Soil Mechanics, Foundation Engineering, Rock Mechanics, and Engineering Geology. It must also be mentioned that in the last four years an international society on Engineering Geology has been created and that the first conference on engineering geology was held in Moscow in June 1968.

Besides the conferences arranged under the premises of affiliated societies, it is difficult to prevent external groups from organizing conferences on subjects closely related to the discipline covered by our international society. For example, the Institution of Civil Engineers in England organized a Symposium on Large Bored Piles in 1966 and has arranged for a conference in London in 1970 on the behaviour of piles. The Spanish National Society kindly proposed to organize the next European Conference on Soil Mechanics in Madrid in 1971 and this proposal had the agreement of the International Society. But, (again agreement with the Vice President, Professor Brinch Hansen), the Spanish organizing Committee had also selected the problem of pile foundations for the theme of the European Conference. This clearly shows how

external organizations can affect the activities of our International Society. It may be worthwhile that the general aspect of this problem should be examined by the Executive Committee, so that the attention of the national societies can be drawn on it.

In general the activities of the European National Societies during the last four years have been closely related to the problems of the construction of tunnels and underground

railways. In many European towns large programs of construction or extension of underground railways and for the building of tunnels under large waterways are in progress.

E. de Beer

Acting Vice President.

#### Appendix J Report on the Activities of the Advisory Committee

During the VIth International Conference on Soil Mechanics and Foundation Engineering in Montreal, September 7 - 15, 1965 it was decided that an Advisory Committee consisting of the Past Presidents, the Vice Presidents and the President be formed to advise the Organizing Committee for the next international conference, to be held in Mexico City in 1969, on the procedure of the Conference.

Following the Montreal Conference the Advisory Committee received a number of letters from members of the ISSMFE with suggestions for improving our future conferences. Based on a study of this material and informal discussions with various members of the Society a first proposal was worked out for the organization of the Mexico City Conference. This proposal was circulated to the members of the committee in December 1965, and after the comments had been received, a "Recommendation for Procedures of the Mexico City Conference" was prepared in July 1966. After circulation, this recommendation was in September 1966 presented to Professor Tamez of the Mexican Organizing Committee, at a meeting in Lisbon. Professor Tamez should then upon his return to Mexico City arrange a meeting of the Organizing Committee in which the proposal for the final programme could be established. However, in February 1967 we received the sad news that Professor Carrillo, President of the Organizing Committee, died on February 19th, and the committee had to be reorganized. As new president Professor Tamez was elected, with Dr. Ramirez de Arellano as Secretary.

On April 19th and 20th a meeting was held at Harvard University where the procedures of the conference were discussed in great detail. Present at this meeting were Dr. Ramirez de Arellano, Secretary of the Organizing Committee, and Dr. Arthur Casagrande and Dr. Laurits Bjerrum from the Advisory Committee.

#### Appendix K (i) Report of the Sub-committee on Literature Classification and International Abstracts Service. June 1969

##### INTRODUCTION

At the 1965 Montreal Conference the Sub-committee on Classification of Geotechnical Literature submitted a proposal for a geotech-

#### Appendice J Rapport sur les activités du Comité Consultatif

In the summer of 1967 the Advisory Committee could make the final approval of the Main Sessions, the Specialty Sessions and the various details of the procedures; and the task of the Advisory Committee was then completed.

The essential features of the Mexico City Conference representing a change in the procedures are as follows:

1. Limitation of scope of Main Sessions to a few selected topics of general interest.
2. Replace general report by "State-of-the-Art Lectures"
3. Reduction of number of papers to be included in proceedings.
4. Introduction of Specialty Sessions.
5. Elimination of introductory lectures.
6. Elimination of Closing Session.

In addition a number of changes and modifications in the procedures and conference programmes have been proposed.

The Advisory Committee would like to express its gratitude to the Organizing Committee of the VIIth International Conference in Mexico City in 1969 for its willingness to accept and try out the new procedures and for the many valuable suggestions received during the cooperation.

#### Members of the Advisory Committee:

A. W. Skempton  
A. Casagrande  
J. Brinch Hansen  
J. G. Zeitlen  
B. A. Kantey

#### Appendice K (i) Rapport du Sous-Comité de Classification de Publications et du Service International des Résumés. Juin 1969

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The Advisory Committee would like to express its gratitude to the Organizing Committee of the VIIth International Conference in Mexico City in 1969 for its willingness to accept and try out the new procedures and for the many valuable suggestions received during the cooperation.

#### Members of the Advisory Committee:

A. W. Skempton  
A. Casagrande  
J. Brinch Hansen  
J. G. Zeitlen  
B. A. Kantey

#### Appendice K (i) Rapport du Sous-Comité de Classification de Publications et du Service International des Résumés. Juin 1969

nical literature classification system that was the result of many years of work (the Sub-committee was formally appointed in 1957 but

external organizations can affect the activities of our International Society. It may be worthwhile that the general aspect of this problem should be examined by the Executive Committee, so that the attention of the national societies can be drawn on it.

In general the activities of the European National Societies during the last four years have been closely related to the problems of the construction of tunnels and underground

railways. In many European towns large programs of construction or extension of underground railways and for the building of tunnels under large waterways are in progress.

E. de Beer

Acting Vice President.

#### Appendix J Report on the Activities of the Advisory Committee

During the VIth International Conference on Soil Mechanics and Foundation Engineering in Montreal, September 7 - 15, 1965 it was decided that an Advisory Committee consisting of the Past Presidents, the Vice Presidents and the President be formed to advise the Organizing Committee for the next international conference, to be held in Mexico City in 1969, on the procedure of the Conference.

Following the Montreal Conference the Advisory Committee received a number of letters from members of the ISSMFE with suggestions for improving our future conferences. Based on a study of this material and informal discussions with various members of the Society a first proposal was worked out for the organization of the Mexico City Conference. This proposal was circulated to the members of the committee in December 1965, and after the comments had been received, a "Recommendation for Procedures of the Mexico City Conference" was prepared in July 1966. After circulation, this recommendation was in September 1966 presented to Professor Tamez of the Mexican Organizing Committee, at a meeting in Lisbon. Professor Tamez should then upon his return to Mexico City arrange a meeting of the Organizing Committee in which the proposal for the final programme could be established. However, in February 1967 we received the sad news that Professor Carrillo, President of the Organizing Committee, died on February 19th, and the committee had to be reorganized. As new president Professor Tamez was elected, with Dr. Ramirez de Arellano as Secretary.

On April 19th and 20th a meeting was held at Harvard University where the procedures of the conference were discussed in great detail. Present at this meeting were Dr. Ramirez de Arellano, Secretary of the Organizing Committee, and Dr. Arthur Casagrande and Dr. Laurits Bjerrum from the Advisory Committee.

#### Appendix K (i) Report of the Sub-committee on Literature Classification and International Abstracts Service. June 1969

##### INTRODUCTION

At the 1965 Montreal Conference the Sub-committee on Classification of Geotechnical Literature submitted a proposal for a geotech-

#### Appendice J Rapport sur les activités du Comité Consultatif

In the summer of 1967 the Advisory Committee could make the final approval of the Main Sessions, the Specialty Sessions and the various details of the procedures; and the task of the Advisory Committee was then completed.

The essential features of the Mexico City Conference representing a change in the procedures are as follows:

1. Limitation of scope of Main Sessions to a few selected topics of general interest.
2. Replace general report by "State-of-the-Art Lectures"
3. Reduction of number of papers to be included in proceedings.
4. Introduction of Specialty Sessions.
5. Elimination of introductory lectures.
6. Elimination of Closing Session.

In addition a number of changes and modifications in the procedures and conference programmes have been proposed.

The Advisory Committee would like to express its gratitude to the Organizing Committee of the VIIth International Conference in Mexico City in 1969 for its willingness to accept and try out the new procedures and for the many valuable suggestions received during the cooperation.

#### Members of the Advisory Committee:

A. W. Skempton  
A. Casagrande  
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J. G. Zeitlen  
B. A. Kantey

#### Appendice K (i) Rapport du Sous-Comité de Classification de Publications et du Service International des Résumés. Juin 1969

nical literature classification system that was the result of many years of work (the Sub-committee was formally appointed in 1957 but



work had actually started in Sweden before 1950). At the time the proposal was submitted it was expected that the Sub-committee's work would be completed in 1966. However, as the result of further meetings immediately following the 1965 Conference, major changes in the classification system were suggested but, unfortunately, little further work was done by the Sub-committee until 1968.

At the 1965 Montreal Conference the Swedish Geotechnical Institute submitted a proposal to publish a geotechnical abstracts journal. A new Sub-committee was appointed to investigate this proposal. In 1967 the Swedish Geotechnical Institute found it necessary to withdraw its offer to publish this abstracts journal. An invitation was then extended to the German Society for Soil Mechanics to investigate the possibility of providing this service and the German Society kindly accepted the invitation.

In 1968 the two sub-committees on literature classification and on abstracts service were combined to form the Sub-committee on Literature Classification and International Abstracts Service. The tasks of this Sub-committee were to co-ordinate the activities in these two areas and to bring to completion the literature classification system because it would be needed for the planned abstracts journal.

It should also be mentioned that the Soil Mechanics Division of the ASCE has had a Committee on Information Retrieval since 1963. This committee has remained very active and liaison has been maintained between this committee of the ASCE and the related sub-committees of the ISSMFE. More will be said about this liaison in a later section of this report.

#### LITERATURE CLASSIFICATION

The basis on which the geotechnical literature classification system has always been constructed is the hierarchical system. This system consists of a series of lower-order divisions, and in the case of the present and past proposals for geotechnical classification systems there are (i) Principal Groups, that are divided into (ii) Main Divisions, that are divided into (iii) Subdivisions, and so on. On looking back at the work of the sub-committee it is clear that the most difficult problem that faced the Sub-committee was to decide on the individual Principal Groups. Another observation that has been made several times with respect to the Sub-committee's task is that the classification system should be simple and should be directed towards the needs of the small user; it should be so structured that it could be expanded to provide an in-depth classification and or retrieval system if that was deemed necessary at a later date.

The new Sub-committee therefore chose as its immediate goal the formulation of a geotechnical literature classification system that consisted only of Principal Groups and Main

Divisions. The proposal for this classification system accompanies this report, and it is intended to satisfy the needs of the German Society for purposes of their abstracts journal and to satisfy the needs of individuals and small companies. Most individuals will require in-depth classification for only a few Main Divisions and the Sub-committee took the view that at this time such in-depth classification could be most effectively done by each individual in consideration of his needs and interests. The proposed classification system can also be used as a retrieval system for private geotechnical libraries but for larger libraries it is inadequate in comparison to excellent existing systems such as the "Key-word Co-ordinate System" (1).

The first three Principal Groups are the same as those proposed at Montreal (A General, B Engineering Geology, C Site Investigations). The next group, D Soil Properties....., includes all matters concerning soil properties and their determination in the laboratory and the field. Group E Analysis....., deals with all aspects of analysis of soil engineering problems (as contrasted with design of engineering structures) and includes all the analytical tools that are used in engineering design. Groups F and G are the equivalents for rock of Groups D and E for soils. Group H includes all the engineering case records; that is, project design, construction and behaviour. Here are included all literature presenting facts concerning the engineering of structures. Group K Improvement of Soil and Rock Conditions includes special processes and equipment used to improve soil and rock conditions (such as; compaction, dewatering, grouting, etc.). Group L Related Disciplines and Group S Snow and Ice Mechanics and Engineering are unchanged from the Montreal proposal.

There are two groups in the Montreal proposal that are not included or not included entirely in the present proposal. The Montreal Group M Materials-Construction is not included. It is partly included in Group H and it was the consensus of the Sub-committee that many materials are not peculiar to geotechnical engineering and that people requiring such a general category as Materials could simply add it to their own classification system. The Montreal Group N Construction Methods (including equipment) is not a specific principal group in the present proposal. It was thought that much of this literature would be classified under the new Group K which would make unnecessary a separate group for construction methods.

To indicate what is intended to be classified under some of the Main Divisions, lists of sub-divisions have been prepared and are included in the proposal. No attempt was made to prepare lists of key words for the various Main Divisions or sub-divisions, as was done in the Montreal proposal. This type of in-depth classification is most effectively done by the individual.

## ABSTRACTS SERVICE

The German Society for Soil Mechanics, through the person of Dr. H. Kuehn, has made a thorough study of the possibility of providing a geotechnical literature service, and at the Executive Committee meeting in Mexico City, a proposal will be presented by the German Society for the publication of a journal called Geotechnical Abstracts. The main points of the proposal are as follows.

- (1) A trial issue of Geotechnical Abstracts will be printed and distributed to the national committees before the Mexico Conference in August 1969.
- (2) If the Executive Committee finds the journal acceptable, the journal will be underwritten for a trial period of three years by the German Society. If the journal is not self-supporting after that time or if sufficient financial support cannot be obtained from other sources, the journal will be discontinued. At the present time the expected yearly cost to each subscriber is about US \$30, based on the number of 2000 subscribers at the end of three years.
- (3) The abstract service will be truly international in scope. Throughout the world, area representatives will be chosen and they will select geotechnical literature that they consider to be of value and will prepare abstracts. These persons will be well-qualified engineers and will be paid for their services. Work has already proceeded towards the establishment of this network of area representatives. The journal will contain only abstracts of selected literature in the field of Soil Mechanics, Foundation Engineering, Rock Mechanics and Engineering Geology and it will not contain everything that is published.
- (4) The journal will be published regularly throughout the year (monthly or quarterly) and the number of abstracts published per year will be from 1500 to 2000.
- (5) Each abstract will be printed in the journal in the format of a card, similar to the ASCE abstracts. The information included on the card will be (i) subject classification, based on the literature classification system that is acceptable to the Executive Committee of ISSMFE, (ii) accession number, (iii) a complete bibliographical reference, (iv) informative abstract of about 100 - 200 words, and (v) list of key words. In each issue of the

journal the abstracts will be grouped in the subject order set out in the Literature Classification System.

## RECOMMENDATIONS

1. It is anticipated that improvements in the proposed classification system will be required. It is recommended that the system be used for a period of about one year by the German Society in their journal Geotechnical Abstracts and that suggested improvements be considered after this period of experience. National Societies would be encouraged to submit suggested changes for the system.
2. In the past there has been communication between the Sub-committee and the ASCE Committee on Information Retrieval and Geodex International. It is recommended that every attempt should be made to work co-operatively with these groups with respect to literature classification systems and to literature abstracts services.
3. To operate effectively and efficiently, a committee should be composed of persons interested and having first-hand experience in the matters of business of the committee. If the Executive Committee decides to retain the Sub-committee on Literature Classification and International Abstracts Service, it is recommended that the Sub-committee be re-appointed and that its membership be reduced to say five persons and that these persons be representatives of literature abstracts services, of active geotechnical libraries and of professional and technical organizations active in literature classification and literature retrieval.

Respectfully submitted,

E. E. De Beer  
B. Broms  
A. Casagrande  
L. F. Cooling  
A. Croce  
N. Flodin (Secretary)  
J. Florentin  
H. Petermann  
T. C. Kenney (Chairman)

Sub-committee on Literature Classification and International Abstracts Service.

Appendix K (ii) Proposal for International Geotechnical Classification System (IGC)

Appendix K (ii) Proposition pour le Système de Classification International de Géotechnique (IGC)

## PRINCIPAL GROUPS

### A GENERAL

### B ENGINEERING GEOLOGY

Including descriptions and case records of natural phenomena.

### C SITE INVESTIGATIONS

Equipment and techniques of exploration, sampling and field testing (excluding determination of engineering properties) and pre-construction field observations.

## ABSTRACTS SERVICE

The German Society for Soil Mechanics, through the person of Dr. H. Kuehn, has made a thorough study of the possibility of providing a geotechnical literature service, and at the Executive Committee meeting in Mexico City, a proposal will be presented by the German Society for the publication of a journal called Geotechnical Abstracts. The main points of the proposal are as follows.

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Sub-committee on Literature Classification and International Abstracts Service.

Appendix K (ii) Proposal for International Geotechnical Classification System (IGC)

Appendix K (ii) Proposition pour le Système de Classification International de Géotechnique (IGC)

## PRINCIPAL GROUPS

### A GENERAL

### B ENGINEERING GEOLOGY

Including descriptions and case records of natural phenomena.

### C SITE INVESTIGATIONS

Equipment and techniques of exploration, sampling and field testing (excluding determination of engineering properties) and pre-construction field observations.

- D SOIL PROPERTIES; LABORATORY AND FIELD DETERMINATIONS  
 Concepts, theories, methods of determination, equipment and results.
- E ANALYSIS OF SOIL-ENGINEERING PROBLEMS  
 Theoretical, empirical and practical methods of analysis.
- F ROCK PROPERTIES; LABORATORY AND FIELD DETERMINATIONS  
 Concepts, theories, methods of determination, equipment and results.
- G ANALYSIS OF ROCK-ENGINEERING PROBLEMS  
 Theoretical, empirical and practical methods of analysis.
- H DESIGN, CONSTRUCTION AND BEHAVIOUR OF ENGINEERING WORKS.  
 Descriptions; case histories; syntheses of investigations, design, construction (including equipment) and behaviour.
- K IMPROVEMENT OF SOIL AND ROCK CONDITIONS. METHODS AND EQUIPMENT
- L RELATED DISCIPLINES
- S SNOW AND ICE MECHANICS AND ENGINEERING

A GENERAL

Main Divisions

- A01 Foundation, Soil and Rock Engineering - Scope
- A02 Historical Aspects
- A03 Bibliographies and Literature Classification
- A04 Textbooks, Handbooks and Geotechnical Periodicals
- A05 Nomenclature
- A06 Companies, Institutes, and Laboratories
- A07 Societies and Meetings
- A08 Professional Ethics and Legal Requirements
- A09 Education

Possible Subdivisions

- A02 Awards  
 Biographies  
 History  
 Obituaries
- A03 Bibliographies  
 Literature classification
- A04 Handbooks  
 Periodicals  
 Publication series  
 Textbooks
- A05 Definitions  
 Descriptors  
 Dictionaries  
 Nomenclature  
 Symbols
- A06 Consultants  
 Firms  
 Institutes  
 Laboratories
- A07 Conferences  
 Societies
- A08 Accidents  
 Building codes  
 Calculated risks  
 Codes of practice  
 Ethics  
 Legal requirements  
 Liability

B ENGINEERING GEOLOGY

Including Descriptions and Case Records of Natural Phenomena.

Main Divisions

- B00 General
- B01 Soil Formation
- B02 Ground Water
- B03 Mass Movements and Subsidence
- B04 Natural Catastrophes (including earthquakes, floods)
- B05 Permafrost and Frozen Ground

- B06 Submarine Geology
- B07 Structural Geology
- B08 Extraterrestrial Geology
- B09 Geomorphology
- B10 Mineralogy and Petrography

- B10 Clay minerals
- Crystallography
- Mineralogy
- Diagenesis
- Metamorphism
- Petrography

Possible Subdivisions

- B01 Deposits - general features
- Deposits - special features
- Residual deposits
- River deposits
- Lacustrine deposits
- Marine deposits
- Glacial deposits
- Wind deposits
- Volcanic deposits
- Organic terrain
- Accumulation and removal of constituents
- Geologic preloading
- B02 Ground water origin and occurrence
- Ground water types
- Ground movements
- Quality of water
- B03 Slow soil flow
- Solifluction
- Landslides
- Land subsidence
- B04 Earthquakes
- Floods
- Waves
- B05 Frost fundamentals
- Distribution of permafrost and frozen soils
- Types of permafrost
- Permafrost landforms, including surface features
- B06 Submarine erosion
- Submarine sedimentation
- Submarine topography
- B08 Lunar geology
- Lunar soils
- B09 Erosion, subaerial
- Enogenetic processes
- Slope Development

C SITE INVESTIGATIONS

Equipment and Techniques of Exploration, Sampling and Field Testing (excluding determination of engineering properties), and Pre-construction Field Observations.

Main Divisions

- C00 General (incl. planning of site investigations)
- C01 Airphoto Surveys
- C02 Geophysical Surveys
- C03 Probings (Soundings)
- C04 Exploratory Excavations
- C05 Boring Technique and Equipment and Recording of Results
- C06 Sampling, Handling of Samples
- C07 Measurement of Field Conditions (incl. ground water, in situ stress)
- C08 Field Testing (excluding tests for engineering properties, see Groups D and F)
- C09 Reports on Site Investigations

Possible Subdivisions

- C02 Geophysical methods - general
- Seismic survey
- Electrical methods
- Gravity methods
- Magnetic methods
- Sonic methods
- C03 Dynamic probing
- Static probing
- Wash probing
- C05 Boring technique - general
- Boring methods and equipment
- Drill rigs and auxiliary equipment
- Recording of boring results, including down-hole techniques
- Submarine boring

Sampling - general  
Sample handling

C07  
Deformation, settlement  
Ground water table  
Ground flow  
In situ stress  
Pore-water pressures  
Temperature

C08  
Seepage tests, pumping tests  
Plate bearing tests  
Pile load tests  
Rock drilling tests  
Blasting tests

D SOIL PROPERTIES: LABORATORY AND FIELD DETERMINATIONS

Concepts, Theories, Methods of Determination, Equipment and Results.

Main Divisions

D00  
General (including laboratory supplies)

D01  
Classification and Identification

D02  
Physico-chemical Properties (incl. corrosion, thixotropy)

D03  
Composition, Structure and Density (including porosity)

D04  
Permeability and Capillarity

D05  
Compressibility (including consolidation and swelling)

D06  
Shear-deformation and Strength Properties (incl. pore-water pressure)

D07  
Dynamic Properties

D08  
Thermal Properties (incl. freezing)

D09  
Compactibility

D10  
Properties of Soil-Additive mixtures

Possible Subdivisions

D01  
Soil classification  
Consistency limits, incl. water content

D02  
Soil-water relationship  
Physical properties  
Chemical properties

D03  
Soil composition  
Grain size and shape  
Soil structure, fabric  
Density, degree of saturation

D04  
Fundamental flow properties  
Determination of permeability and capillarity  
Filter properties

D05  
Fundamental properties  
Compressibility and swelling  
Consolidation  
Secondary-time effects  
Repetitive loading

D06  
Fundamental properties  
Stress-strain properties  
Elastic properties  
Failure criteria  
Liquifaction  
Compression tests, incl. triaxial  
Direct shear tests  
Vane tests  
Fall cone tests

D08  
Thermal properties  
Freezing properties

D09  
Fundamental properties  
Compaction tests  
Compaction test equipment

D10  
Additives  
Soil mixtures  
Stabilized soils

E ANALYSIS OF SOIL-ENGINEERING PROBLEMS

Theoretical, Empirical and Practical Methods of Analysis.

Main Divisions

E00  
General

E01  
In Situ Stresses caused by Gravity  
Applied Loads and Excavations

E02  
Deformation and Settlement Problems (including piles)

E03  
Bearing Capacity of Soils

E04  
Bearing Capacity of Piles

E05 Earth Pressure Problems (incl. silos)

E06 Stability of Slopes, Cuts and Excavations

E07 Seepage and other Hydraulic Problems (incl. erosion)

E08 Dynamic Problems

E09 Frost Action and Heat-Transfer Problems

E10 Behaviour of Base Courses and Pavements

E11 Soil-vehicle Interaction (trafficability)

Possible Subdivisions

E01 Basic Theories  
Stresses caused by gravity  
Stress distribution from vertical loads  
Stress distribution from horizontal loads  
Contact pressures

E02 Basic theories  
Settlement analysis  
Consolidation theories  
Secondary time effects  
Preloading and unloading  
Regional settlements  
Settlements due to climatic conditions, vegetation, etc.  
Settlements due to dynamic and repetitive loadings

E03 Basic theories  
Bearing capacity of footings  
Foundation failure of embankments

E04 Basic theories  
Bearing capacity of individual piles  
Pulling resistance  
Pile driving formulae and problems  
Bearing capacity of pile groups  
Piles and pile groups subjected to lateral forces

E05 Basic theories  
Earth pressure on retaining walls  
Earth pressure on temporary supports  
Earth pressure on free and anchored sheet piles  
Stability of double wall and cellular cofferdams

Earth pressure on tunnels and shafts  
Earth pressure on conduits  
Silo pressure

E06 Basic theories  
Stability of natural slopes  
Stability of cuts and excavations  
Stability of dam slopes  
Stability problems - special

E07 Basic theories  
Seepage to wells and drains  
Seepage into excavations  
Seepage through and below dams  
Piping, heave and internal erosion  
Surface water erosion

E08 Basic theories  
Impact problems  
Machine foundations  
Earthquake effects  
Blast effects  
Wave propagation  
Dynamic response

E09 Basic theories  
Temperature distribution in soil  
Thermodynamic conditions  
Heat exchange at ground surface  
Frost penetration  
Frost problems related to structures

F ROCK PROPERTIES: LABORATORY AND FIELD DETERMINATIONS

Concepts, Theories, Methods of Determination, Equipment and Results.

Main Divisions

F00 General (incl. laboratory supplies)

F01 Classification and Identification

F02 Physico-chemical Properties (incl. weathering resistance)

F03 Composition, Structure and Density (including porosity)

F04 Permeability and Capillarity

F05 Compressibility and Swelling

F06 Shear-Deformation and Strength Properties

F07 Dynamic Properties

F08 Special Properties of Rock  
(incl. thermal, electric and  
magnetic properties)

Possible Subdivisions

F01 Rock classification  
Rock identification  
Rock hardness (drillability)  
Rock quality (incl. recovery,  
velocity ratio, fracture frequency)

F02 Geochemical properties of rock  
Weathering resistance

F03 Density and porosity  
Composition  
Structure

F04 Permeability  
Capillarity

F05 Compressibility  
Swelling  
Time effects

F06 Elastic properties  
Plastic properties  
Compression strength  
Tensile strength  
Residual strength

F08 Thermal properties  
Electric properties  
Magnetic properties

G ANALYSIS OF ROCK-ENGINEERING PROBLEMS

Theoretical, Empirical and Practical  
Methods of Analysis

Main Divisions

G00 General

G01 In Situ Stresses caused by Gravity,  
Tectonics, Applied Loads and  
Excavations

G02 Deformation Problems

G03 Bearing Capacity of Rock

G04 Stability of Slopes, Excavations  
and Openings

G05 Seepage Problems (incl. drainage)

G06 Dynamic Problems

G07 Frost Action and Heat-Transfer  
Problems

H DESIGN, CONSTRUCTION AND BEHAVIOUR OF  
ENGINEERING WORKS

Descriptions; case histories; Syntheses  
of Investigations, Design, Construction  
(including equipment and materials) and  
Behaviour.

Main Divisions

H00 General (incl. general contracts  
and specifications)

H01 Foundations of Structures (buildings,  
bridges, tanks, etc.)

H02 Retaining Structures and Cutoff  
Walls

H03 Unsupported Excavations

H04 Earthworks, Embankments, Fills and  
Dams (for compaction see K01)

H05 Underground Structures (incl.  
tunnels, conduits and shafts)

H06 Base Courses and Pavements of Roads  
Railroads and Airfields

H07 Harbours, Canals and Coastal  
Protective Works

Possible Subdivisions

H00 General contracts  
General specifications

H01 Equipment  
Materials  
Shallow foundations, incl.  
underpinning  
Piled foundations  
Deep foundations, excluding  
piles

H02 Equipment  
Materials  
Retaining walls  
Sheet-pile walls  
Cellular cofferdams



Cutoff walls  
Sheeted excavations  
Tie-back walls

H03

Equipment  
Open cuts  
Open pits

H04

Equipment  
Embankments  
Fills and dumps  
Earth-fill dams  
Rock-fill dams

H05

Equipment  
Materials  
Tunnels in soil  
Tunnels in rock  
Cavities in rock  
Shafts  
Conduits and culverts

H06

Equipment  
Materials  
Airfields  
Railroads  
Roads

H07

Equipment  
Materials  
Harbours  
Canals  
Coastal protective works  
River regulation works

K IMPROVEMENT OF SOIL AND ROCK CONDITIONS.  
METHODS AND EQUIPMENT

Main Divisions

K00

General

K01

Compaction

K02

Dewatering and Drainage

K03

Grouting

K04

Stabilization of Soils

K05

Preloading

K06

Thermal Processes (freezing  
and burning)

K07

Electrical Processes

K08

Rock Reinforcement and Support

Possible Subdivisions

K01

Surface compaction  
Deep compaction

K02

Ground-water lowering  
Wells and pumps  
Surface drainage  
Vertical drains

K03

Cement grouting  
Clay grouting  
Chemical grouting

K04

Additives  
Mixing equipment

K07

Electrochemical methods  
Electro-osmosis

K08

Rock bolts  
Rock anchors  
Rib supports

L RELATED DISCIPLINES

Main Divisions

L01

Pure Sciences

L02

Geological Sciences

L03

Agriculture and Pedology

L04

Meteorology and Climatology

L05

Biosciences

L06

Civil Engineering

L07

Mining Engineering

L08

Mechanical Engineering

L09

Electrical Engineering

L10

Ocean Engineering

L11

Military and Naval Engineering

L12

Instrumentation and Measuring  
Technique

L13  
Library Science

Possible Subdivisions

L01  
Chemistry  
Mathematics  
Physics  
Computer science

L05  
Botany  
Zoology

L06  
Building Industry  
Coastal Engineering  
Construction  
Highway and Railway Engineering  
Hydraulic Engineering  
Irrigation and Drainage Engineering  
Pipelines  
Power Engineering  
Sanitary Engineering  
Structural Engineering  
Surveying and Mapping  
Town Planning  
Transport Engineering  
Waterways and Harbours

Appendix L Report of the Symbols and Definitions Sub-Committee

Nous rendons compte ci-après de l'activité du Sous-Comité des Symboles et Définitions depuis le Congrès de Montréal.

Tout d'abord, la liste des symboles et définitions adoptés au dernier congrès de Montréal a été mise au point et insérée dans le Lexique Technique publié en 1967 par la Société Internationale de Mécanique des Sols et des Travaux de Fondations sur l'initiative de M. Ch. SCHAEERER, Président de la Commission de Rédaction du Lexique Multilingue.

On sait qu'il s'agit là d'une 3ème édition en 8 langues faisant suite à la 2ème édition en 6 langues parue en 1954, et qui était épuisée dès 1960.

L'UNESCO, par l'intermédiaire de l'U.A.T.I. (Union des Associations Techniques Internationales) au cours de délibérations auxquelles j'assistais personnellement, avait accepté de subventionner cette 2ème édition.

Je voudrais ici saisir l'occasion de la parution de cette 3ème édition du Lexique pour exprimer toute ma gratitude à M. Ch. SCHAEERER pour le travail considérable qu'il a accompli. Il faut en effet s'être occupé de ces questions, souvent ingrates, pour savoir quelle somme de travail elles demandent et quelle correspondance elles appellent.

S SNOW AND ICE MECHANICS AND ENGINEERING

Main Divisions

S01  
Snow and Ice Cover

S02  
Properties of Snow and Ice

S03  
Snow and Ice Engineering

Possible Subdivisions

S01  
Snow occurrence and depth  
Avalanches  
Glaciers  
Ice cover on water bodies

S02  
Physical properties of snow  
Physical properties of ice  
Thermodynamics of ice-water systems

S03  
Snow and ice as structural materials  
Snow and ice removal  
Protection methods and structures against snow and ice

Appendice L Rapport du Sous-Comité des Symboles et Définitions

Les membres de notre Sous-Commission ayant constaté que ces réunions entraînent des frais importants de voyage et des pertes de temps, il a été proposé par M. TER STEPANIAN de procéder par correspondance, et à cette occasion M. TER STEPANIAN et le Professeur SCHULTZE ont proposé que soient normalisés quelques symboles et définitions supplémentaires.

Tous mes collègues n'ont pas eu la possibilité d'exprimer complètement leur avis sur ces nouvelles propositions, et il leur a apparu, comme à moi-même, qu'il y avait lieu de s'accorder une période de "digestion" à la suite de l'adoption des 70 symboles déjà parus.

Il y a à cet égard lieu de se féliciter de l'adoption de plus en plus généralisée de ces symboles et définitions, ce qui contribue constamment à apporter une clarification dans les rapports entre tous les Ingénieurs de Mécanique des Sols.

Je pense personnellement que l'adoption de nouveaux symboles se heurtera à de nombreuses habitudes nationales, et que d'autre part, l'adoption de trop nombreux symboles ne s'impose pas; leur multiplicité risquerait d'affaiblir leur respect.

Voici les conclusions auxquelles j'arrive

L13  
Library Science

Possible Subdivisions

L01  
Chemistry  
Mathematics  
Physics  
Computer science

L05  
Botany  
Zoology

L06  
Building Industry  
Coastal Engineering  
Construction  
Highway and Railway Engineering  
Hydraulic Engineering  
Irrigation and Drainage Engineering  
Pipelines  
Power Engineering  
Sanitary Engineering  
Structural Engineering  
Surveying and Mapping  
Town Planning  
Transport Engineering  
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Voici les conclusions auxquelles j'arrive

et qui devraient être examinées dans le Congrès Spécial de Mécanique des Sols, Congrès Spécial décidé par les organisateurs du congrès avec le plein accord de notre Président International, et sur les suggestions notamment de divers membres actifs de notre Société, tels que le Dr. GOLDBER, et M. JURGENSON qui ont écrit sur la Terminologie en Mécanique des Sols des articles fort pertinents dans GEOTECHNIQUE.

1°) Je pense que dans le Congrès Spécial de Mexico, pourrait être proposée l'adoption d'une dizaine de symboles et définitions nouveaux seulement, au premier rang desquels je verrais les suivants:

-Contraintes principales  $\sigma_1$   $\sigma_2$   $\sigma_3$

$\sigma_1$  la plus grande

$\sigma_3$  la plus petite

$\sigma_2$  l'intermédiaire.

- $q_u$  contrainte limite de compression simple

- $k_a$  coefficient de poussée

- $k_p$  coefficient de butée

-  $\alpha$  : angle d'obliquité de la contrainte agissant sur une paroi plane

-  $E$  : module de déformation

2°) Le Professeur TSCHBOTARIOF, ainsi que Monsieur JURGENSON, signalent que des ajustements sont nécessaires dans le Lexique Technique en ce qui concerne les expressions dans les 8 langues; et comme l'exprime fort bien le Professeur TSCHBOTARIOF, cela vient du choix de la langue qui constitue le point de départ des traductions et de la différence de richesse des diverses langues. Nous pensons que ce travail, qui serait inclus dans une 4ème édition du Lexique, pourrait être effectué au sein de la Sous-Commission des Définitions et Symboles dans les 4 années à venir.

3°) La question se pose pour moi de savoir s'il ne convient pas de donner certaines définitions des termes inclus dans le Lexique Technique, définitions qui seraient données à part pour des

termes marqués d'un astérisque. Il est évident à cet égard que, pour donner deux exemples: le terme 1576, "examen à vue" ne nécessite aucune définition; par contre, le terme 437 : "distorsion", appelle sans aucun doute une définition (en français, notamment, ce terme peut avoir deux significations).

4°) Il apparaît que la Mécanique des Sols utilise de plus en plus le langage de la Rhéologie; des travaux importants de définition des termes de Rhéologie ont été effectués récemment, en dehors de la Mécanique des Sols, et il y aurait lieu à mon sens d'introduire les termes et définitions correspondantes dans le Lexique. Je fais allusion par exemple aux termes suivants: déviateur (dont la définition est différente suivant qu'il s'agit en mécanique générale et en pratique courante de Mécanique des Sols), déformation retardée ou différée, durcissement, amollissement, raideur, complaisance, dureté, etc.... Peu de nos collègues seraient en mesure de donner, de mémoire, une définition correcte de ces termes qui sont pourtant très importants dans l'étude des tassements.

Des définitions précises ayant été données en Rhéologie, à mon sens, il y a lieu de s'y conformer et d'y donner une très large publicité en Mécanique des Sols, en les introduisant dans le Lexique Technique: il n'y a en effet aucune raison en Mécanique des Sols de ne pas se rattacher aux définitions et symboles de la Mécanique Générale.

5°) Je pense aussi qu'il est bon qu'une certaine relève soit faite pour mener à bien tout le travail qui reste à faire, et personnellement j'ai demandé à être relevé de mes fonctions de Président du Sous-Comité et je souhaite bonne chance à ceux qui continueront ce travail dont on ne cessera jamais de souligner l'utilité.

Paris, le 14 Avril 1969

J. KERISEL

Appendix M Report of Sub-committee on Soil Sampling

The following sub-committee was elected at the Vth Conference to undertake studies in soil sampling.

Aitchison (convener) and Mori, Broms, Osterber, with Hvorslev as adviser and Wood as secretary.

Appendice M Rapport du Sous-Comité de Prises d'Echantillons

This sub-committee was in fact the committee of the International Group on Soil Sampling and the subsequent activities of the sub-committees of this International Society of Soil Mechanics and Foundation Engineering have been fully integrated with I.G.O.S.S. matters.

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### Terms of Reference

No specific terms of reference were defined as the basis for the program of the committee. It was clearly intended however that the principal objective should be that of continuing the work undertaken previously by the I.G.O.S.S. group under the guidance and chairmanship of Dr. T. Kallstenius.

Nevertheless since it was a basically new committee which was charged with this rather vague task, the first and principal activity consisted of an attempt to define the most important areas of the whole state-of-the-art of soil sampling.

The appointment of the sub-committee at the conclusion of the VIth International Conference precluded any real opportunities for planning of activities during that Conference, and as matters have turned out also precluded any possibility for a full meeting of the committee between the VIth and the VIIth Conference. Accordingly, it became necessary to arrange for separate talks between pairs of individual members whenever other interests created an opportunity for a meeting. It has been the good fortune of the convener to meet at least once with each member of the committee during the four-year period but a gap of three years existed between the first and the last of these conversations. (This difficulty of arranging in-person meetings represents a major limitation to the potential effectiveness of an international committee - but that topic is not a matter for discussion in this report).

Arising from these individual meetings and general correspondence it became apparent that very little thought indeed was being directed towards the subject of soil sampling. The process of soil sampling was being undertaken - in almost every part of the world - as a matter of habit. In those few areas which could boast of a high standard of soil engineering together with an active program of basic soil research it appeared that the habit of soil sampling was a good one. In all other areas soil sampling tended to be merely a bad habit with much of the available knowledge subjected, often deliberately, to the demands of commercialism. Underperformance on the part of soil engineers engaged in site investigation appeared to be common and in turn there were many suggestions of underperformance on the part of soil engineers engaged in the design process.

No attempt was made to document any causes of this unsatisfactory degree of performance. Dissatisfaction was stated widely and these statements in general terms were accepted as sufficient to determine a policy for the committee's activities.

### The Program

It was considered that the various aspects of the whole process of soil sampling could be treated in several major parts. These included:

- (1) The apparatus of soil sampling;
- (2) The procedures of soil sampling;
- (3) The logic of soil sampling (from the soil mechanics point of view); and
- (4) The quality of soil sampling.

A great deal of attention has been given, in recent years, to the apparatus of soil sampling. A multitude of sampling devices and a great number of items of equipment for operating these devices have been described in the literature. The volume of these types of publications does not appear to be diminishing and it did not seem to be an important function of the committee to further promote this line of activity - although there is no suggestion that developments along these lines are not valuable.

The second topic - the procedures of soil sampling - has not received comparable attention. In fact there is evidence that, in many circumstances, the poor standard of performance of well known procedures of soil sampling has limited the program of soil engineering in a community. This widespread deficiency in sampling practice, within an already described technology, is a matter of real concern and one that warrants a comment from this committee. It is felt that very considerable effort should be devoted to the establishment of a proper code of practice for soil sampling in each community but it appears to be logical to regard these efforts as being the responsibility of each community. Consequently, while expressing concern at this deficiency, the committee did not regard this topic as appropriate, at this time, for international action.

The two remaining topics were selected for major attention. It became apparent that the literature contained very few examples of careful thought of the interactions that must occur between the successive stages of a logical site investigation coupled with laboratory study and subsequent evaluation. These stages might be outlined as :

- Firstly : the definition of a problem involving soil engineering ;
- Secondly: the appreciation by the soil engineer of the (expected) properties of the (expected) soils of the site with emphasis on those properties which may be critical for the stated engineering purpose ;
- Thirdly : the awareness by the soil engineer of laboratory and computational procedures involved in the quantification of the soil properties ;
- Fourthly: (and not earlier) the decision by the soil engineer concerning the sampling method (including dimensions and type of apparatus and operating procedures) ; and
- Finally: the necessary checks in the field and the laboratory to

ensure that the soil engineering process (including soil sampling) did in fact meet the demands of the stated engineering problems.

There is of course no doubt that many competent soil engineers have followed this pattern of thinking. In all probability much of the equipment available today has emerged from this thought process but there are remarkably few documented cases in which the soil mechanics reasoning behind the use of a specific sampling device for a specific purpose has been stated.

There appeared to be a great deal of value in the publicising of knowledge within the general terms of reference of "the soil mechanics aspects of the process of soil sampling". The purpose of the collation and presentation of this knowledge was threefold. Firstly it was considered to be desirable to show the place of soil engineering thought as a prerequisite to soil sampling in a logical process of site investigation. Secondly it was intended to demonstrate the probable or actual value (or, alternatively, inapplicability) of any process of soil sampling in relation to characteristic problems on important soil types, and, thirdly it was intended to highlight the gaps in present knowledge with a view to the encouragement of relevant research in these areas.

On the basis of this line of reasoning and with considerable support in principle from a number of senior engineers it was arranged that papers should be invited to a symposium on 'the soil mechanics aspects of the process of soil sampling'. In the course of development this symposium came to be synonymous with Specialty Session No 1 of this Conference as it was considered essential that papers should receive adequate discussion.

It has come as a matter of some surprise to the committee to note the reluctance of engineers to write on this topic. Despite the strongest pretestations of interest by many, only a comparatively few authors have even attempted to present a paper. If it is accepted that there is a real interest in this subject the question must be asked whether the lack of willingness to prepare papers reflects a lack of ability to do so - or in other words reveals a lack of continuity in the soil engineering thought process.

This question cannot yet be answered for the material to be presented to Specialty Session No 1, in the form of papers and the contributions of Discussion Leaders, has not been subjected for consideration. However in recognition of the importance of seeking further expressions of opinion on the state-of-the-art of the soil mechanics aspects of soil sampling several preliminary meetings were held in centers throughout Asia and in U.S.A. Meetings with soil engineers were held, as I.G.O.S.S. activities, in Bangkok, Nongkong, Osaka, Tokyo and Chicago, and the opinions expressed at these meetings will be further debated during Specialty Session No 1.

Certainly it does appear that a great deal of effort will have to be expended on the production of adequate demonstrations of the soil mechanics reasoning behind decisions to sample (or not to sample) according to a particular technique. The committee feels very strongly that this effort is worthwhile as a useful contribution to rational soil engineering. For this reason it proposes that this work should continue.

The fourth aspect of soil sampling involves the definition of quality. Many of the simpler lines of soil mechanics reasoning in the determination of sampling procedures for specific soils can now be stated but they often tend to lack acceptance because of a lack of an appropriate language for the expression of both the purpose and the achievement of the sampling process.

The committee feels that urgent attention should be given to the task of defining - preferably on an international basis - three aspects of sample quality. There are :

- (1) The parameters of quality of a soil sample and the rationalization of these parameters into quality classes ;
- (2) The procedures which may be expected to achieve specified sample qualities (defined in terms of parameters or classes) in specified materials ; and
- (3) Test procedures for the measurement of sample quality.

A useful contribution on sample quality will be presented by Dr. Muhs for discussion in the latter part of Specialty Session No 1.

#### Continuation of program

This committee certainly has not achieved all that it had hoped. Although its real progress cannot be judged until the end of this Conference it is certain that the two main tasks - that of seeking to define the soil mechanics aspects of soil sampling and that of seeking to specify the quality of a soil sample - must both be pursued vigorously for a significantly longer period of time if worthwhile results are to be attained.

Subject to the approval of the Executive Committee it is hoped that a further Specialty Session on Soil Sampling might be organized by this sub-committee at the forthcoming Asian Regional Conference and possibly at other Regional Conferences. It is considered that a more or less continuous pressure must be exerted on the soil engineering profession in order to elucidate much of the known potential of soil sampling.

In every meeting which has been held to date, engineers have stressed the potential benefits to the profession which could arise from an upgrading of present practices - which have often degenerated to a substandard level merely because of a lack firstly of coordinated evidence of the desirability of high quality operations (in relation to the

task in hand); and secondly of a means of specifying the desired quality in sampling operations.

The sub-committee feels as a result of these expressions of opinion that a continuation of its efforts might well be warranted. The work of the sub-committee would be greatly facilitated by better opportunities for contact between members and with National and Regional Soil Groups.

Other associated activities

The International Group on Soil Sampling continues to operate as a forum for the interchange of ideas and information. Data obtained from questionnaires reveal a progressive increase in the level of sophistication of apparatus, in the awareness of a need for some standardisation of apparatus and in the production of codes of practice.

It is expected that I.G.O.S.S. activities will continue as an essential part of the process of the establishment of communication between soil engineers.

Further report

This report is necessarily incomplete since the forthcoming Specialty Session No 1 and the meetings of I.G.O.S.S. are essential parts of the present program.

A report of these activities will be presented in written form immediately after this Conference.

G.D. AITCHISON  
CONVENER



OPENING SESSION IN HONOR OF NABOR CARRILLO

SEANCE INAUGURALE A LA MEMOIRE DE NABOR CARRILLO

Unidad de Congresos, Centro Médico Nacional, August/Août 25, 1969

Participants

PROF. ENRIQUE TAMEZ G., President of the Organizing Committee

MR. JOSE HERNANDEZ TERAN, Minister of Hydraulic Resources,  
in representation of the President of México, LIC. GUSTAVO DIAZ  
ORDAZ

DR. LAURITS BJERRUM, President of the International Society for  
Soil Mechanics and Foundation Engineering

DR. ARTHUR CASAGRANDE, Former President of the International  
Society for Soil Mechanics and Foundation Engineering

MRS. ELENA CARRILLO, Mexico City

E. TAMEZ G.

Mr. José Hernández Terán, representative of the President of México and Minister of Hydraulic Resources; Mrs. Elena Carrillo, Dr. Bjerrum, President of the International Society for Soil Mechanics and Foundation Engineering; distinguished Presidium; ladies; Colleagues.

In keeping with your wishes expressed in Montreal, Canada four years ago, we are gathered here today in Mexico City to celebrate the Seventh Conference of our International Society for Soil Mechanics and Foundation Engineering. On this occasion our international meeting embodies a series of innovations, both with regard to procedure as well as to the content of the agenda itself. These innova-

tions have been suggested by the directors of our International Society in constant communication with the Advisory Committee recently created to assist, on the basis of its experience, the organizing committees of these meetings. Through various published bulletins you have been informed of the details of these procedural changes which, without doubt, fundamentally reflect the general opinion that such changes were necessary in our International Conferences as a consequence of the increasing number of papers being presented and the physical impossibility of permitting adequate discussion for each of them. It is the feeling of the Organizing Committee of this Conference that the procedure proposed for the main sessions will allow for wider discussion of those items of greatest general interest at the time, without, however, pretending to cover the entire field of soil mechanics. On the other hand, the specialty sessions will permit detailed discussion of specific subjects which are of interest to small groups. There is no doubt that the introduction of these procedures will constitute in itself an experiment whose aim it is to find new means to make these meetings more fruitful for all those who attend them and for our profession as a whole.

And what better place to carry out this experiment than here in this great soil mechanics laboratory, Mexico City. We hope that all of your contributions will make it a success.

The agenda for the main sessions was drawn up in such a manner as to be of both general interest to our profession and of local interest to the host country of the Seventh Conference. Consequently, two of the items, that concerning Foundations in Clay and the one concerning Tunnels and Deep Excavations in Soft Soil, are of great interest for the solution of soil problems in Mexico City.

Foundation engineering practice in this city constitutes a hard test for soil mechanics, both theoretical and experimental. To design and build good foundations here, implies to deal with soft, highly compressible, expansive colloidal and very thick clay deposits. But

if all these inconveniences were not enough to complicate the lives of the soil specialists, we further add to our difficulties by drinking the subsoil water and thus causing the general subsidence of the city.

I do not want to alarm you, but you should know that next friday, when we close this conference, the building where we are now gathered will be 2 millimeters closer to sea level. Fortunately enough, there are still other 2300 meters, and our authorities have taken all the necessary measures to control this phenomenon and it will be completely eliminated in the near future. I can assure you that when you will honor us again with your visit next time, our city will be in the same place and it will still have the same climate.

Theory and experimentation, together with observation of reality have helped us to understand and solve our complex foundation problems, and have created a basic expertise on which it is possible to undertake the subway construction and the deep sewage collecting tunnels, both works with no precedent in Mexican engineering, because of their magnitude and complexity, that are now being carried through by the government of Mexico City.

In addition, the Government of our country, through the Department of Water Resources and the Federal Commission of Electricity, has been carrying out an intensive dam construction program both for the purposes of irrigation as well as for electric energy. Most of these dams are of the earth or earth-and-rock type. In view of this we have given this item special attention.

Of equal importance to us as the previous item, is Specialty Session No. 18, concerning soil mechanics and its application to the design and construction of roads and airport runways, an activity into which our Department of Public Works has been putting great effort for many years.

Basic research in our country, although on a modest scale, has developed in several fields of general interest. One of the most outstanding is that concerned with the study of stress-strain characteristics and shearing strength of rockfill masses.

On large size specimens subjected to pressures of up to 25kg/cm<sup>2</sup>. This research has been carried out by the Federal Commission of Electricity and the Engineering Institute of the National University of Mexico and has stirred up enough world interest to merit a special session for the discussion of this item.

Thus, we are certain that the exchange of experiences between Mexican specialists and those of other parts of the world will be

beneficial to all of us and will contribute firmly to the progress of soil mechanics and foundation engineering.

Today, as fate would have it, it befell me to address you on the occasion of the opening of this Conference. I am doing so in place of the man who was President of the Organizing Committee of this Conference and whose enthusiasm for the advancement of soil mechanics to a great degree encouraged the Mexican delegates to the Sixth Congress in Canada to request so enthusiastically the honor of being your hosts on this occasion. A pioneer of soil mechanics in Mexico, a distinguished disciple of Casagrande and Terzaghi and collaborator of the latter in the solving of serious problems such as that of the subsidence of Long Beach, California; an outstanding engineer in our specialty, a brilliant teacher and extraordinary Rector of our National University, a man whose scientific curiosity impelled him to delve into the field of nuclear energy, in conjunction with soil mechanics, produced an ambitious and brilliant project of enormous national interest and importance which here has been named the Texcoco Project. He proposed the construction of a large, electric power plant which, combined with the desalting and pumping of the ground water of Lake Texcoco, would produce an intense subsidence of the lake bed and bring it to a lower level than that of the present center of Mexico City thus eliminating the danger of flooding of this part of the city. At the same time the available water would be sufficient to discontinue present pumping from the deep aquifers under the area and its subsidence would thus be totally eliminated.

The electric plant would at the same time satisfy the need for increasing energy demands in order to keep up with the intense population growth of our capital city.

Many of you who knew him and enjoyed his pleasant and cheerful personality know that I am referring to Nabor Carrillo whose memory and works still live among us.

Today, in the memory of Nabor Carrillo and in the name of the Mexican Soil Mechanics Society I am honored to extend to you our most cordial welcome and to express to you our sincerest wishes that your stay in our country will be both fruitful and pleasant.

J. HERNANDEZ TERAN

Sr. Dr. Laurits Bjerrum, Presidente de la Sociedad Internacional de Mecánica de Suelos e Ingeniería de Cementaciones; Honorable Presidium; Señores Delegados al Congreso; Señoras y Señores.

A nombre del Presidente de México, Lic. Gustavo Díaz Ordaz, tengo el honor de dar a ustedes, Delegados al VII Congreso de la Socie

dad Internacional de Mecánica de Suelos e Ingeniería de Cimentaciones, una cordial bienvenida, y transmitirles los deseos del propio Primer Mandatario: que el Congreso que hoy se inicia, sea de gran provecho para todos y que, los delegados extranjeros, durante su estancia en nuestra patria, sientan la cordialidad con que nuestro pueblo recibe a todos los visitantes, a quienes considera miembros de una familia universal.

El hombre, desde épocas remotas, ha estudiado los componentes de la corteza terrestre, con fines muy diversos. Desde los que se encaminan al conocimiento del origen de la tierra en relación a otros astros del universo y su transformación a través de las edades geológicas, hasta los de carácter eminentemente utilitario, para localizar recursos explotables que, nuestro planeta, nos brinda en múltiples formas.

Rocas y suelos componen la capa superficial de la corteza terrestre; de ellos, el hombre toma lo necesario para realizar obras materiales, utilizándolos en su estado natural o sujetándolos, previamente, a procesos de transformación.

El estudio de suelos y rocas, mediante la aplicación de disciplinas técnicas, ha dado origen a especialidades científicas que hoy tienen aplicación universal, en muchos campos del desarrollo.

De esas especialidades, la Mecánica de Suelos con no más de medio siglo de antigüedad, ha logrado importantes avances y es herramienta indispensable de la ingeniería, porque nos permite conocer cualitativa y cuantitativamente las propiedades de los suelos como elementos de construcción, sea para sustentar estructuras o como parte integrante de ellas.

En México, la Mecánica de Suelos, data de unos 40 años. Podemos afirmar que se inició con uno de los problemas más apasionantes y de mayor interés, que puedan presentarse: el suelo de la ciudad de México.

Nuestra capital está construida sobre rellenos lacustres, formados en su mayor parte por limos y arcillas, con elevada proporción de vacíos, que determinan muy alta compresibilidad. Estos rellenos han sufrido hundimientos de considerable magnitud, que, ahora sabemos, son ocasionados en gran medida, por la extracción del agua subterránea, destinada al abastecimiento público y a los usos y aprovechamientos industriales.

En 1925, el ingeniero Roberto Gayol llamó la atención sobre este fenómeno y, más tarde, el ingeniero José A. Cuevas, precursor de los estudios de Mecánica de Suelos en nuestro país, señaló el camino para explicarlo. Corresponde al doctor Nabor Carrillo, en 1948, demostrar que la causa principal del fenómeno, era el abatimiento de niveles piezométricos profundos, producidos por la extracción de aguas subterráneas. Estos tres destacados ingenie-

ros mexicanos, han desaparecido, pero otros muchos han continuado el estudio del suelo de la ciudad, aportando nuevos y valiosos conocimientos y experiencias, que han permitido resolver problemas que parecían insalvables.

La Secretaría de Recursos Hidráulicos, a partir de 1954, ha efectuado observaciones sistemáticas en estaciones piezométricas y nivelaciones periódicas en el área de la ciudad de México, que han permitido registrar los hundimientos de la superficie. Con datos fragmentarios, pero valiosos, se ha reconstruido la evolución anterior del hundimiento hasta 1891. Ello nos permite afirmar que desde principios del siglo, hasta 1938, el hundimiento de la antigua traza de la ciudad registró 4.5 centímetros por año; después, a partir de 1938 fue aumentando, para llegar a un máximo de 46 centímetros en 1951 y, en los últimos 6 años, el promedio anual se ha reducido a 7 centímetros.

A pesar de la amplia información disponible, puede decirse que las predicciones sobre el futuro comportamiento del suelo de la ciudad de México, son simples especulaciones. Sólo puede afirmarse que, si se conserva o reduce la intensidad del bombeo de agua subterránea, el hundimiento disminuirá paulatinamente. Por ello, nos esforzamos en aumentar el abastecimiento de agua de la ciudad de México, trayéndola desde fuera del área metropolitana, porque estamos conscientes de que disminuir el problema del hundimiento, significa salvaguardar los cuantiosos intereses representados por la colosal obra que, a través del tiempo, ha integrado una ciudad con más de 7 millones de habitantes.

Pero la experiencia mexicana en Mecánica de Suelos, no se ha limitado a la ciudad y Valle de México, porque, como he mencionado, esta ciencia interviene en todas las ramas de la ingeniería.

Hacia el año de 1936, la antigua Comisión Nacional de Irrigación, que más tarde se transformó en la Secretaría de Recursos Hidráulicos, dio un gran impulso a la Mecánica de Suelos, al aplicarla especialmente a la construcción de presas de tierra, en las cuales se tiene una larga experiencia, por el gran número de estas obras construidas en México. Esta actividad ha propiciado el perfeccionamiento o desarrollo de equipos de laboratorio y procedimientos de construcción, propios de nuestro país, que ustedes podrán observar durante su estancia en México.

En otras dependencias oficiales, encargadas de realizar obras públicas, la Mecánica de Suelos también ha sido objeto de particular atención, e igualmente, han logrado significativos avances, aplicados a la cimentación de estructuras de muy diversos tipos y a la construcción de terraplenes.

En el sector privado, se han constituido empresas especializadas y los conocimientos y la experiencia de los técnicos de estas empresas, han sido determinantes en la evolución que he mencionado.

Finalmente, nuestras universidades e institutos de enseñanza superior, también participan en el desenvolvimiento de la Mecánica de Suelos, que es materia obligatoria en programas de ingeniería.

Señoras y señores, me he permitido la libertad de ocupar la atención de ustedes para exponerles en términos muy generales, el desarrollo en nuestro país de la ciencia que hoy nos congrega. Pero el mayor interés de México, en este VII Congreso Internacional de Mecánica de Suelos e Ingeniería de Cimentaciones, es el de conocer los adelantos y experiencias logradas en los países por ustedes representados. Adelantos y experiencias que podrán tener en México aplicación inmediata, porque felizmente, vivimos una etapa constructiva de particular significación para nuestro desarrollo económico, en el cual, pueblo y gobierno, estamos empeñados. Tenemos la convicción de que en reuniones como ésta, todos tenemos mucho que aprender y algo que enseñar. Muchas gracias.

Dr. Laurits Bjerrum, President of the International Society for Soil Mechanics and Foundation engineering; Distinguished Presidium; Conference Delegates, Ladies and Gentlemen.

On behalf of the President of México, Gustavo Díaz Ordaz, I am honored to extend to you, the Delegates to the Seventh Congress of the International Society on Soil Mechanics and Foundation Engineering, a cordial welcome and to express to you the following wishes of our Chief Executive: first, that this Conference which is opening today will be of great benefit to all of you, and secondly, that the foreign delegates during their stay in our country will feel the cordiality with which our people welcomes all visitors as they consider them to be members of a universal family.

The Man, since remote times, has studied the components of the earth's crust with various aims—from those which lead to knowledge of the origin of the earth with regard to other heavenly bodies and its transformation throughout the geological ages, to those of a utilitarian nature, in order to find the exploitable resources with which our planet provides us in multiple forms.

Rock and soil constitute the upper layer of the earth's crust, and from them man extracts the necessary materials for his works by using them in their natural state or subjecting them first to a transformation process.

The study of soil and rocks through different technical disciplines has given rise to scientific specialities which today enjoy universal application in many fields of development.

Of these specialties, soil mechanics, in existence for only half a century, has progressed greatly and has become an indispensable tool in engineering since it provides us with

qualitative and quantitative knowledge of soil properties as construction elements either for the purpose of supporting structures or as integral parts thereof.

In México soil mechanics has been in existence for some forty years. We may say that it began with one of the most interesting problems, that of the subsoil of Mexico City.

Our capital is built on lake fills formed principally by silts and clays with a high void ratio which implies a high degree of compressibility. These fills have been subjected to subsidences of considerable magnitude which we know today are caused to a great extent by the extraction of ground water for public and industrial use.

In 1925 Roberto Gayol called attention to this phenomenon and later José A. Cuevas, a predecessor of the study of soil mechanics in Mexico, suggested an explication of it. Doctor Nabor Carrillo in 1948 demonstrated that the main cause of the phenomenon was the lowering of deep piezometric levels produced by the extraction of underground water. These three outstanding Mexican engineers are no longer with us, but many others have continued study of the city's soil to contribute new and valuable knowledge for the solution of what seemed to be unsolvable problems.

Since 1954 the Department of Water Resources has carried out systematic observation in piezometric stations and periodic level measurements in the Mexico City area, which have provided us with surface subsidence measurements. With fragmentary but valuable data a history of this subsidence has been reconstructed to as far back as 1891. Thus we know that since the beginning of the century until 1938 the center of the city subsided at a rate of 4.5 centimeters per year. After 1938 it increased gradually, reaching a maximum of 46 centimeters in 1951, and in the last six years the annual average has diminished to 7 centimeters.

In spite of the large amount of information we have at hand, it may be said that any predictions regarding the future behavior of Mexico City's soil are purely speculative. We can only state that if the pumping rate is maintained or reduced the subsidence will gradually diminish. For this reason we are making efforts to increase the city's water supply by bringing it in from outside the metropolitan area, because we know that by reducing the problem of subsidence we are safeguarding the many interests involved in this enormous project which has encouraged the growth of a city of 7 million inhabitants.

However our experience in soil mechanics has not been limited only to Mexico City and the Valley of Mexico, because as I mentioned earlier, this science is present in all fields of engineering.

Towards the year 1936 the former National Irrigation Commission, which later became the Department of Water Resources, gave great impe-

tus to soil mechanics by applying it specifically to the construction of earth dams in which we have long experience because of the large number of such projects built in Mexico. This activity has fostered the perfection or development of laboratory equipment and building procedures apt for our country and which you will be able to observe during your stay in Mexico.

In other official organizations entrusted with the construction of public works, particular attention has been achieved in its application to the laying of foundations of structures of very varying nature and to the construction of embankments.

In the private sector, specialized enterprises have been created and the knowledge and experience of the technicians of these enterprises have been very important in the evolution I have mentioned.

Finally, our universities and institutes of higher learning are also taking part in the development of soil mechanics which has become a compulsory subject in engineering programs.

Ladies and gentlemen, I have attempted here to speak in very general terms of the development in our country of the science which has brought us together today. However in this Seventh International Congress on Soil Mechanics and Foundation Engineering, Mexico's main interest lies in knowing the most recent developments and hearing of the experiences of the countries you represent, developments and experiences which could find immediate application in Mexico since fortunately we are living in a constructive stage of particular importance to our economic development, in which both the Government and the people are participating. We are convinced that during meetings such as this we all have much to learn and something to teach. Thank you.

M. Laurits Bjerrum, Président de la Société Internationale pour la Mécanique des Sols et des Travaux de Fondations; Membres du Bureau; Messieurs les Délégués au Congrès; Mesdames et Messieurs.

Au nom du Président du Mexique, M. Gustavo Díaz Ordaz, j'ai l'honneur, Messieurs les Délégués au VII<sup>e</sup> Congrès de la Société Internationale de Mécanique des Sols et des Travaux de Fondations, de vous souhaiter la bienvenue et de vous transmettre ses vœux pour que ce Congrès qui commence aujourd'hui, soit de grand bénéfice pour tous et que, pendant leur séjour dans notre pays, les délégués étrangers sentent la cordialité avec laquelle notre peuple reçoit tous les visiteurs qu'il considère membres d'une famille universelle.

L'homme, depuis les anciens temps, a étudié les composants de l'écorce terrestre avec

dès buts bien différents: buts qui mènent à l'étude de l'origine de la terre en relation avec les autres astres de l'Univers et sa transformation à travers les âges géologiques et buts de caractère notamment utilitaire, pour situer les ressources naturelles - que notre planète nous offre sous des formes multiples.

Les roches et les sols forment la couche superficielle de l'écorce terrestre; l'homme y puise ce qui lui semble nécessaire pour accomplir des travaux matériels, en les utilisant dans leur état naturel ou en les soumettant préalablement à des procédés de transformation.

Par l'application de disciplines techniques, l'étude des Sols et des Roches a donné naissance à des spécialités scientifiques qui ont une application universelle dans les travaux de développement.

De celles-ci, la Mécanique des Sols, jeune de 50 ans, a mené à bien des progrès importants et c'est là l'instrument indispensable du Génie, car il nous permet de connaître, en qualité et en quantité, les propriétés des sols comme éléments de la construction, pour supporter des structures ou comme une partie intégrale d'elles.

Au Mexique, la Mécanique des Sols, date d'environ 40 ans. Nous pouvons donc affirmer qu'elle a commencé avec un des problèmes les plus passionnants et intéressants qui se soit présenté; le sol de Mexico.

Notre capitale est construite sur des remblais lacustres, formés notamment de limons et d'argiles, avec une grande proportion de vides ce qui lui donne une compressibilité très élevée. Ces remblais ont subi des tassements de magnitude considérable, dûs dans une grande mesure - nous le savons aujourd'hui - au pompage de l'eau souterraine, destinée à l'usage et à la consommation publics et industriels.

En 1925, l'ingénieur Roberto Gayol remarqua ce phénomène et plus tard l'ingénieur José A. Cuevas, précurseur des études de Mécanique des Sols dans notre pays, indiqua le chemin pour l'expliquer. En 1948, le Docteur Nabor Carrillo démontra que ce phénomène était dû au tassement de niveaux profonds et piézométriques, produits par l'extraction des eaux spéculations. On ne peut qu'affirmer que, mexicains ne sont plus parmi nous, mais beaucoup d'autres ont poursuivi l'étude du sol de la ville, en apportant des connaissances et des expériences nouvelles et précieuses, qui ont permis de résoudre des problèmes jusque là obscures.

Depuis 1954, le Ministère de Ressources Hydrauliques a procédé à des observations systématiques dans des stations piézométriques et a effectué des mesures périodiques du nivellement à Mexico, et qui ont permis d'enregistrer des tassements de la surface. A l'aide de données fragmentaires mais précieuses, on a reconstitué l'évolution du tassement jusqu'

en 1891. Ceci nous permet d'affirmer que depuis le début du siècle, jusqu'en 1938, le tassement de l'ancien site de la Ville enregistra 4.5 centimètres par an; ensuite, à partir de 1938, il augmenta et atteignit un maximum de 46 centimètres en 1951, et dans les dernières six années, la moyenne annuelle s'est réduite à 7 cms.

Malgré la vaste information à notre portée, on peut dire que les prédictions pour le futur du sol de Mexico ne sont que de simples souterraines. Ces trois éminents ingénieurs l'intensité du pompage de l'eau souterraine est maintenue ou réduite, le tassement diminuera lentement. C'est pour cela que nous réalisons un grand effort pour augmenter l'approvisionnement de l'eau de Mexico, en la faisant venir de l'extérieur de la zone urbaine; nous sommes en effet conscients du fait que diminuer le problème de tassement implique sauvegarder les nombreux intérêts représentés par cette oeuvre colossale, qui, à travers le temps, a contribué à former une ville de plus de 7 millions d'habitants.

Mais l'expérience du Mexique, en Mécanique des Sols, ne s'est pas limitée à la ville et à la Vallée de Mexico, car, comme je l'ai déjà dit plus haut, cette science intervient dans toutes les branches du Génie.

Vers 1936, l'ancienne Commission Nationale d'Irrigation, qui devint plus tard le Ministère de Ressources Hydrauliques, donna un grand essor à la Mécanique des Sols, en l'appliquant essentiellement à la construction des barrages en terre, que nous connaissons bien grâce à notre expérience et au nombre considérable des travaux de ce genre construits au Mexique.

Cette activité a favorisé le perfectionnement et le développement d'équipement pour laboratoires et de procédés de construction, qui nous sont propres et que vous aurez l'occasion de voir pendant votre séjour au Mexique.

Dans d'autres bureaux officiels, chargés de mener à bien des travaux publics, la Mécanique des Sols a reçu une attention spéciale et a accompli des progrès de grande portée dans son application à la fondation de structures de types très divers et à la construction de terrassements.

Dans le secteur privé, des entreprises spécialisées ont été créées, et, la connaissance et l'expérience des techniciens de celles-ci ont été importantes dans l'évolution dont j'ai déjà parlé.

Finalement, nos universités et nos instituts d'enseignement supérieur prennent part également au développement de la Mécanique des Sols qui est une matière obligatoire dans les programmes du Génie.

Mesdames et messieurs, j'ai voulu vous exposer en termes très généraux le développement, dans notre pays, de la science qui nous réunit ici aujourd'hui. Ce pendant, le plus grand intérêt du Mexique, pendant le VII<sup>e</sup>

Congres International de Mécanique des Sols et des Travaux de Fondations, est celui de connaître les progrès récents et les expériences qui pourront avoir au Mexique une application immédiate, car heureusement, nous assistons à une étape créatrice très importante pour notre développement économique, dans lequel le peuple et le gouvernement se sont consacrés. Nous sommes persuadés que dans des réunions semblables à celle-ci, nous avons tous beaucoup à apprendre et quelque peu à enseigner. Merci beaucoup.

L. BJERRUM

Mr. Jose Hernandez Teran, Representative of the President of Mexico and Minister of Hydraulic Resources,

Mr. Enrico Tamez, President of the Organizing Committee,

Ladies and Gentlemen:

On behalf of all those present I wish to thank Mr. Teran and Mr. Tamez for those inspiring words of welcome. It is a great pleasure for our Society and for all the participants in this conference to be able to assemble in Mexico City. I express our hearty thanks to Mexico, to its government, to the Organizing Committee and to all those colleagues who by their contributions have made this conference possible.

Mexico City and my own city Oslo in Norway, are, as far as I know, the two capitals in the world which have the most difficult foundation conditions, and for some time there has been a sort of competition between them as to which deserves the position of number one. When at home and when speaking to an audience where no Mexicans are present, my national pride may have tempted me to give Oslo the leadership. But to be very honest, I know the Mexico City clay sufficiently well to appreciate that Mexico City, beyond any doubt, is the world-record holder for difficult soil conditions.

One of the big attractions of this conference has been to come to Mexico City to see and learn about the foundation problems of the exceptional Mexico City clay. In addition, the beauty of the city and the colourful population have increased our desire to have a meeting here, and caused our ladies to accompany us in such great numbers.

I greet all participants and members of the large family of soil mechanics. We have all been looking forward to seeing old friends and making new acquaintances. I hope we shall have a pleasant meeting in the same spirit that dominated our previous conferences.

Fifty Years of Soil Mechanics

Exactly 50 years ago the modern science of soil mechanics was born. It was on a day in March 1919 in Istanbul that Terzaghi, while sitting on a rock and looking out over the Golden Horn, suddenly visualized what was needed to obtain a rational approach to the problems involved in earthwork and foundation engineering. He realized that progress depended entirely

on the development of testing equipment and methods which could give a quantitative measure of the mechanical properties of the soils involved. On a sheet of paper he scribbled down a number of different tests to be carried out, made some sketches of the equipment and suggestions for the interpretation of the test results. Those events in March 1919 represent the birth of modern soil mechanics, and thus we can celebrate 50 years of soil mechanics.

This anniversary gives me the opportunity to look back over the past 50 years in an attempt to find out to what degree Terzaghi's vision in 1919 has come true, with the hope that reviewing the experience of the past may lead to conclusions that can guide us in the studies which lie ahead of us.

Before embarking on our review, permit me to try to express the main content of Terzaghi's wish-dream when in 1919 he drew up the outline of the new science of soil mechanics.

A few years earlier Terzaghi had failed in his attempt at correlating the behaviour of foundations with the geological characteristics of the soils involved. He now hoped to establish such a correlation replacing the visual geological characteristics with their significant engineering properties as measured in experiments. He thus envisioned a first stage in the development during which problems would be solved by an empirical approach based on previous experience and on knowledge of the relevant soil properties.

Clearly, Terzaghi also visualized a second and ultimate stage in the development, when the problems would be solved by a more rigorous approach similar to that which had already been successfully applied by structural engineers in the design of buildings and bridges. This approach would require borings to be carried out to obtain a picture of the geological conditions and to permit samples to be taken from the various soil strata. These samples would be tested in the laboratory to determine their mechanical properties. Numerical answers to the problems would be calculated theoretically by the method of applied mechanics after introducing into the theoretical equations the relevant soil properties as found in the laboratory. By this approach Terzaghi envisioned that it would be possible to compute settlements of buildings, safety factors of slopes, the amount of water flowing beneath dams, and earth pressures on retaining structures, and so on.

#### The first period of pioneering

And now we can start our journey into the past. It can immediately be said that the most impressive conclusion which emerges from this review is that the past 50 years have been a convincing success for the new science of soil mechanics. Terzaghi's first creative period of fundamental studies and testing in the early twenties was quickly followed by what we might call 'the first stage of application' during which the new discoveries were successfully used in practice. When the first international conference on soil mechanics and foundation engineering was held at Harvard University in 1936, soil mechanics became firmly established as a new fundamental science in the field of civil engineering, and creation of our International Society became possible. Since then soil mechanics has found its place in our community in a way which is familiar to all of you, and our Internat-

ional Society has grown from a few hundred members in 1936 to about 9,000 today.

The explanation of the explosive development of soil mechanics is clearly that it could offer assistance within a field where there existed a desperate need for help. Actually, this need was so great that the results of Terzaghi's findings were applied almost as soon as they appeared, and well before design procedures had been developed and their reliability adequately tested. We can thus recognize a first generation of soil engineers who developed a true art in applying the newly acquired knowledge to practical problems. The tools they had at their disposal were an improved understanding of the properties of soils and rocks, some simple testing equipment, Terzaghi's qualitative analysis of the various phenomena, and - as time went by - the experience gained from mistakes made by themselves or by their colleagues. The early success and later progress of the science of soil mechanics is due entirely to the achievement of these pioneers headed by Terzaghi himself.

As the years went by, the tools were gradually developed which would permit soil mechanics to proceed from the first to the second stage, and the intuitive approach to be replaced by the more systematic theoretical approach. By the end of the thirties the development of the new science had proceeded so far that Terzaghi's dream of 1919 approached its realization; and when the inferno of World War II finally came to an end, the way was paved for a second generation of soil engineers, a generation which had at its disposal most of the tools required to solve the problems in earthwork and foundation engineering by the use of what we might call "the approach of applied mechanics"

#### Twentyfive years of rational approach

Twenty-five years have elapsed since then, and by now a considerable amount of experience has been collected which permits a comparison of theoretical forecast and actual behaviour of foundations. We should therefore be able to evaluate how well the theoretical approach has worked in practice.

Obviously, we will not include in our evaluation any uncritical application of theories and test results. In dealing with a material like soil, satisfactory results of an analysis can be expected only if the analysis is based on a careful interpretation of the geological conditions, on equally careful testing of the samples, and finally on use of sound judgement to assess the effect of the various factors not directly included in the analysis, such as non-homogeneity of soil strata, scattering and errors in test results, representivity of samples and so on. Similarly, we will exclude cases in which the geological conditions preclude the possibility of making an accurate performance forecast.

With these limitations the experience of the past leads to the conclusion that there are numerous examples which demonstrate our ability to analyze a number of essential problems and predict in a logical and rational manner the engineering behaviour of soils in practice.

In soft clays we can, for instance, predict the bearing capacity of footings, and the stability of braced excavations. We can estimate the magnitude and rate of settlements of footings and embankments on soft clay, provided the load is not too small. In soils

such as sand and gravel, silt, glacial till, and also in slightly overconsolidated clays, satisfactory results are obtained from calculations for the stability of slopes and for earth pressures on retaining structures. In most pervious materials we are able to predict the flow of water beneath dams and towards excavations. Equally satisfactory are the forecast of the behaviour of earth and rock fill dams and, generally speaking, on the basis of laboratory tests we can predict the compaction behaviour of soils. Our methods and procedures for design of pile foundations work reasonably well.

Thinking again of Terzaghi sitting outside Robert College in Istanbul in 1919, we can now conclude that he was right when he envisaged that ultimately a stage of development would be reached at which the problems in earthwork and foundation engineering would be solved by the classical approach of applied mechanics. Obviously, over the years we have learned to appreciate that many of our problems are so complex that the possibilities of using successfully a theoretical treatment are limited in practice. In such cases it has, therefore, proved necessary to develop less rigorous semi-empirical procedures. Nevertheless, we have today definitely grown out of the period in which problems were solved by guesswork and intuition. The procedures available in applied soil mechanics represent a logical and rational approach which can be described in text books, can be taught in universities and can be applied by a capable civil engineer after he has obtained some training in practice.

As soon as we have reached this conclusion, we must, nevertheless, admit that there is also available a relatively large number of carefully studied cases in which the classical approach of soil mechanics proved to be a failure. In these cases a comparison between a carefully performed prediction and the actual behaviour has shown discrepancies so large that they could not be explained by inhomogeneities of the soil strata, nor by the scattering of the test results.

For instance, there are numerous examples demonstrating our inability to predict the amount and rate of settlement of structures on heavily overconsolidated clays. Moreover, in our soft normally consolidated marine clays in Scandinavia, the methods for predicting settlements and the rate at which they occur, fail completely when the applied load is relatively small, as is usually the case for buildings.

With respect to the slope stability problem, the classical approach seems to fail in these same two materials. We are unable to calculate the stability of natural slopes in heavily overconsolidated plastic clays and clay shales, and we are no better off when facing the problem of analyzing the stability of natural slopes in soft, normally consolidated, marine clays of Scandinavia.

In fact, the number of case records, which show a discrepancy between forecast and actual behaviour, is so large that there is every reason for us to try to find out what is wrong, and then to improve our procedures accordingly.

Recently, I had an opportunity to study in detail several problems which were not successfully tackled by conventional procedures. The review of these case records led to very clear conclusions which may be able to guide us in our attempts to

improve our procedures.

### Settlements of buildings on clay

The most interesting conclusions emerged from a comparison between observed and predicted settlements of buildings and embankments built on the soft marine clays which are the most widespread foundation soils in Norway. The comparison led to the surprising result that the agreement between prediction and observation was very good in all cases where the settlements were very large, i.e., more than 20-30 cm, and when this was the case the theory of consolidation predicted the rate of settlements reasonably well. However, in all cases where the settlements were smaller than 15-20 cm, the predicted settlements were larger than the observed ones, the observed rates of settlements were much faster than the theoretical forecast, and the smaller the settlements, the greater the discrepancies. To illustrate the order of magnitude of the discrepancies, it was found that the predicted settlements were in general 4-8 times the observed values. In other words, the agreement was poor when the applied pressures were small, but good when the pressures were relatively large.

As this problem is of vital importance to Norway, my colleagues and I recently made a rather comprehensive study to find the explanation for this discrepancy. The studies demonstrated that there were no errors made in the theoretical analysis: the mistakes were made when assumptions about the compressibility of the clay were introduced into the theory. In fact, the major mistake was made when it was assumed that the clays were normally consolidated, and that their compressibilities could therefore be adequately described by a straight line in the conventional consolidation diagram showing void ratio against logarithm of pressure.

From a detailed study of the field behaviour of soft clays we have been able to prove that in terms of its engineering properties no marine clay is truly 'normally consolidated', even when it never were subjected to greater loads than the present overburden. Except for very young sediments all clays have undergone some changes since they came to equilibrium under their present overburden pressures. The consequence of these changes is that the clays have developed a 'reserve resistance' against further compression. The clays have become brittle and can now carry an additional vertical load without undergoing any significant volume change, provided the load does not exceed the developed reserve resistance. It is only for loads exceeding this critical value that the clay behaves as if it were truly normally consolidated.

The special properties which these soft clays have developed since their deposition, causes them to behave as brittle materials. During the process of sampling, handling and testing the clays, these essential features may very easily be destroyed. For this reason the special properties of normally consolidated clays have mostly been overlooked or misinterpreted in the past. It was actually only after having obtained a deeper understanding of the true properties of normally consolidated clays that it became possible to design suitable sampling and testing equipment and to carry out adequate tests to prove the existence of these special properties.

From these studies we have thus learned that the pro-



properties of normally consolidated clays are much more complex and diverse than supposed hitherto. The simplified picture of the properties of a normally consolidated clay introduced into a conventional settlement analysis proves thus to be a satisfactory approximation only if the applied load is larger compared with the reserve resistance that the clay may have developed during its geological life, and in such cases the classical approach predicts the correct settlement. For small loads, normally consolidated clay may behave very differently from each other in accordance with such factors as their plasticity, their geological age, and the physico-chemical changes to which they have been subjected. These special properties of the different types of normally consolidated clays can be detected only from a study of their field behaviour. As soon as the properties are known and adequately described, sampling and testing procedures might be designed to measure them and theories can be developed to predict the field behaviour. Having reached this stage, there should be no more discrepancies between forecast and actual field performance.

So much for the normally consolidated clays. I mentioned earlier that comparisons of predicted and actual settlements on overconsolidated clays indicate that the settlement calculation is at least as inaccurate in clays of this type as in normally consolidated clays. The explanation of this discrepancy is still not known; but it is not unlikely that part of the inaccuracy of our present concepts arises because we ignore the effect of the large horizontal stresses generally existing in overconsolidated clays as a result of their geological stress history. As emphasized by Dr. N. Simons in a paper to this conference, the effect of a large horizontal stress is to reduce the vertical compression of the clay. This reduction does not appear in the results of conventional consolidation tests which are carried out with samples that have been unloaded laterally before being placed in the equipment.

Our present approach thus employs concepts about the properties of overconsolidated clays which are too simplified and crude. Improved settlement predictions become possible in overconsolidated clays only when new equipment and procedures have been designed to permit measurements of the lateral pressures existing in the ground, and after new theories have been developed to take into account the effect of the initial stresses on the settlement.

#### Stability of natural slopes in clay

Finally, let us consider our ability to predict the danger of slides in natural slopes and cuttings in heavily overconsolidated plastic clays and clay shales. Compared with the other problems I have mentioned, it is this problem that in the past shows the largest discrepancies between predicted and actual behaviour. Fortunately, a qualitative explanation can be given of why the procedures which work in other soils fail completely in the overconsolidated clays and clay shales. Again, the explanation proves to be that this family of clays possess some very complex properties that invalidate any conventional theoretical analysis, and which in addition prove to be either impossible or, at best, very difficult to detect and measure in a conventional laboratory test. The properties that distinguish the heavily overconsolidated clays and clay shales from other clays can be summarized by three points:

In the first place, these clays have a system of defects and are not 'intact'. Already in the mid-thirties it had been appreciated that some overconsolidated clays are fissured and that they contain joints, surfaces, or more-or-less fully developed slip surfaces. Obviously, such defects represent surfaces of weakness which can reduce the strength of the clay-mass to much below that of the intact clay. Thus, in many civil engineering works the behaviour of the clay is governed largely by the strength along such discontinuities. Unfortunately, the effect of the fissures does not appear in conventional laboratory tests on small samples. We can measure the strength of the intact clay, or we can measure the residual shear strength in a fully developed sliding surface, but we have no means of determining where in between these extreme limits the actual shear strength of the clay lies.

In the second place, these clays are brittle and strain sensitive. They fail at a very small strain, and when they are strained beyond failure the shear strength drops rapidly and ultimately reaches a residual value which in the plastic clays is very low. As pointed out by Skempton in his Rankine Lecture in 1964, clays with this property are likely to fail progressively, and Skempton therefore concluded that slides in overconsolidated clays are in many cases preceded by the progressive development of a failure surface along which the shear strength is reduced to values nearly equal to the residual shear strength.

The third property is the one which probably initiates the progressive failure and which governs the rate at which the progressive failure develops. In connection with the studies of a landslide which occurred in 1963 in the western part of Norway, we were forced to conclude that the progressive failure was initiated by stress concentrations at the toe of the slope and that the stress concentrations were due to the high lateral stresses resulting from the tremendous pressures to which the clay was subjected at an earlier stage of its geological history. We found also that the progressive development of a continuous slip surface was dependent on the ability of the clay to strain laterally when unloaded, i. e., on the recoverable strain energy. We still have no means of measuring this property and describe it adequately, but clearly it is strongly dependant on what the clay has experienced during its geological life, including such factors as the degree of overconsolidation, the formation of diagenetic bonds and the degree of weathering.

Obviously, the overconsolidated clays and clay shales have properties which are very complex and which are therefore difficult to measure and to express in such terms that can be considered adequately in a theoretical approach. I am unable to predict whether we will ever be able to produce an analysis of the stability of a slope in these intricate clays which realistically takes into account all the essential factors, or whether we will have to be satisfied with a less rigorous and more empirical approach. However, one thing I do know for a fact, that further progress depends on our ability to measure and describe the true properties of the clays as they are manifested in the ways in which they behave in nature.

#### Conclusions

So far my review has been somewhat one-sided, as it has dealt exclusively with problems in clay. I could equally well have illustrated my points by problems

involved in predicting the flow of water through fine-grained soils or by problems of predicting the behaviour of masses of hard fissured rock. In each category predictions based on a classical approach of applied mechanics frequently fail completely, and again it is not the theory which is wrong. The approach fails on account of lack of knowledge of the actual in-situ properties of the rock or soil in question.

Let me now end this address by summarizing in two points my conclusions from this critical voyage back through the 50 years of modern soil mechanics.

In the first place, we can draw the unconditioned conclusion that the development of the science of soil mechanics has exceeded even the most optimistic expectations which Terzaghi may have made when, 50 years ago in Istanbul, he tried to envision the future of this new field of engineering. Within 25 years soil mechanics was well on its way to producing rational methods and procedures to replace the earlier period's more intuitive approach, based on partly uncorrelated experience. Today there are available to the soil engineer the tools required to solve a substantial part of the problems he has to face in his practice, and experience has demonstrated that these tools can be used with confidence for predicting the actual behaviour of foundations.

In the second place, the review has also demonstrated that if the available approaches are applied to certain types of problems involving certain types of soils, they fail completely. The available case records illustrating this finding show discrepancies between theory and practice which in many cases are very serious and, indeed, much greater than can be explained by inhomogeneities or scattering of test results.

The explanation of these discrepancies between predicted and actual behaviour has proved to be due not to errors in the theories: in every case it has proved to be the result of a lack of appreciation of the true properties of the soils. In many cases the picture of the properties on which the conventional soil mechanics approach was based had been far too simplified and deviated so much from the actual picture that it precluded the possibility of any realistic prediction. When working with these problems, one obtains the impression that very many natural soils within their geological life have developed a number of special properties of an almost unbelievable diversity, which were so ingeniously concealed as to remain undetected in conventional field and laboratory testing.

Obviously, there exists a field of research to which too little attention has been paid in the past, and which is essential if soil mechanics is to be successfully applied to natural clays. This field concerns the study of natural soils with the purpose of understanding, describing and measuring the properties which are significant for the field of soil mechanics. To come as close as possible to the true properties, these studies will have to concentrate on field rather than laboratory behaviour, and they will have to include the investigation of all geological factors that may have influenced the relevant properties.

We can probably find no better name than Engineering Geology for this field of research, in spite of the fact that it has no resemblance to Engineering Geology as understood by a geologist. Actually, should we

try to explain to a geologist some of the factors influencing the mechanical properties of a clay, he would only understand what we were speaking about if he had a comprehensive background in soil engineering. It is quite obvious that we cannot expect the geologist to solve our problems for us; on the contrary, the field of research I am speaking about is so intimately related to the mechanical properties of soils that the success of any study of the engineering geological properties of a soil presumes an intimate understanding of the fundamentals of the mechanical properties of soils combined with a comprehensive knowledge of their field behaviour when subjected to stresses or strains.

If, at the end of my period as president of our International Society, I can convey a message to our members, it is to appeal to the younger generation to concentrate their efforts on a study of this extremely important field of research. We are, in soil mechanics, dealing with soils and rocks which are complex products of nature and, truly speaking, the concepts we have developed so far about their properties and behaviour are so primitive and simplified that I dare to postulate that we have barely started to understand the true properties of some of the more complicated types of materials. It is research in this direction that is required to develop our science further, so that we can gradually replace the remaining unreliable design procedures with more adequate and accurate approaches.

I may therefore complete this address by expressing the hope that this international conference may contribute to this ultimate goal.

#### A. CASAGRANDE

Mr. José Hernández Terán, Minister of Hydraulic Resources and Representative of the President of Mexico; President Laurits Bjerrum; President Enrique Tamez; Fellow Members of our Seventh International Conference; Ladies and Gentlemen.

The Organizing Committee has asked me to address you in memory of Nabor Carrillo; to tell you about a book which his colleagues have just published in his honor, and then to present to Mrs. Carrillo a copy of this book

It is not easy for me to tell you in a few minutes about the accomplishments of this brilliant scientist, engineer, educator, administrator, and humanitarian - about a very remarkable man and my very dear friend. Let me start by recalling that Nabor Carrillo mentioned to me in Paris, in 1961 at the time of our Fifth Conference, that he would like to have this Seventh Conference meet in Mexico City. Indeed, we owe it to his initiative and his friendship with the highest Government officials of Mexico that we are privileged to enjoy now the hospitality of our Mexican colleagues. If fate had not taken him away from us so prematurely, Nabor Carrillo would see today his cherished dream fulfilled.

I met Carrillo for the first time in June 1936, just one-third of a century ago, when

he was the youngest member of the Mexican Delegation to our First Conference which then met at Harvard University. A few years later, from 1940 to 1942, Carrillo studied at Harvard University where he quickly caught the attention and earned the enduring friendship of the late Karl Terzaghi and the late Dean of our School Harold Westergaard, and of myself. In 1942 Carrillo was awarded his Doctor of Science degree from Harvard University on the basis of a brilliant thesis. He returned to Mexico, and was immediately appointed to a professorship at the National University of Mexico, and within a few years he became Director of Scientific Research of his University. Then followed eight long and arduous years during which he guided his University as Rector through the period of its most rapid growth. Finally, in the last phase of his professional career, he served as member of the Mexican Nuclear Energy Commission, and on other special assignments as a scientific ambassador-at-large to his Government.

During his tenure as Director of Scientific Research, Carrillo was instrumental in promoting comprehensive investigations on the unusual subsoil conditions of Mexico City, and in initiating extensive observations of the continuous subsidence of this city. By means of his own investigations Carrillo was able to prove beyond any doubt that this general subsidence was caused primarily by the extensive extraction of groundwater. He published his findings in his classical paper THE INFLUENCE OF ARTESIAN WELLS IN THE SINKING OF MEXICO CITY which is reproduced in this volume. This paper had a catalytic effect on the foundation engineers of Mexico and it led to the decision by the City Authorities to prohibit the drilling of new wells within the city.

A few years later, Carrillo investigated a similar problem, namely, the causes of the subsidence of the City of Long Beach in California. For this purpose he developed a novel solution of the theory of elasticity which he termed the "tension center theory", and with which, he was able to prove that the settlements were caused by the pumping of oil from three separate zones located at depths of many thousands of feet. Carrillo's reports on these investigations including his tension center theory are now published for the first time in this volume.

Carrillo has inspired many promising Mexican students to specialize in soil mechanics and he was successful in obtaining sufficient financial support for research in foundation and earthwork engineering. It is largely due to his efforts that Mexico has achieved its eminent position in theoretical and applied soil mechanics.

After his demanding administrative duties at the University forced him to discontinue his private consulting practice, and later after he accepted the key position with the Nuclear

Energy Commission, he continued to maintain his interest in soil mechanics. Finally, by cross-fertilization of such widely separate areas of engineering science as nuclear energy and soil mechanics, he envisioned the possibility of curing simultaneously the two grave illnesses of Mexico City, namely the lack of a sufficient water supply and the continuous sinking of the city. When Carrillo first explained to his colleagues his concept of what is now called the Texcoco Project, even very knowledgeable engineers doubted whether such an ambitious project could be realized. However, all who have been connected with the comprehensive Texcoco investigations are now in agreement that the feasibility of this project is proven. These investigations are summarized in several very interesting papers in this volume. The execution of this project, which I believe is now assured, will be a worthy monument to Carrillo's genius.

Nabor Carrillo's remarkable combination of talents and human qualities explain his wide range of achievements in science, engineering, education, and human affairs. He combined the qualities of a clear-thinking, mathematically gifted scientist, the vision of a statesman, and an engineer's sound judgment of what is humanly possible. His greatest achievements depended particularly on his vision, his ability to foresee clearly far into the future the needs of his country and of his fellow men, and on his extraordinary talent to convince those whose support he needed, an ability which in turn was based on a deep understanding of human nature and a genuine and warm sympathy for the welfare of his fellow men. In his presence men with divergent, even conflicting short-term goals, suddenly became interested in cooperating on a long-term project for the welfare of all people. Merely by his presence he seemed to create a cohesive bond between men who otherwise could not find a common basis for the solution of difficult problems. This magnetic spell surrounded him wherever he went. He was a human catalyst par excellence.

This volume (which will be available in the book store on the ground floor) contains in Part I a selection of Carrillo's important contributions in soil mechanics, and in Parts II and III a number of contributions by six other well-known Mexican engineers on the subsidence of Mexico City, which was the topic of Nabor's first major scientific work, and on the Texcoco Project, which was Nabor's last and most important achievement as an engineer.

It gives me great pleasure to present to you, dear Elena, and to your children, this book which was made possible by the Texcoco Project under the auspices of the Ministry of Finance, or to use its correct name -La Secretaría de Hacienda y Crédito Público.

(Then Dr. Casagrande proceeded to surrender to Mrs. Elena Carrillo and her oldest son, copies of the book.)

Castillo de Chapultepec August/Août 29, 1969

Participants

PROF. ENRIQUE TAMEZ G., President of the Organizing Committee

DR. LAURITS BJERRUM, President of the International Society for  
Soil Mechanics and Foundation Engineering

DR. RALPH B. PECK, elected President of the International Society for  
Soil Mechanics and Foundation Engineering

PROF. JEAN KERISEL, in the name of French-speaking Conference  
Members

MR. GILBERTO VALENZUELA, Minister of Public Works

MRS. LUCIA GURI, in the name of Latinamerican ladies

MRS. MANAN, in the name of American ladies

E. TAMEZ G.

Dr. Bjerrum, Dr. Peck, Ladies and Gentlemen:

Today we have successfully reached the end of our Conference journey. I believe all of you will agree with me, that if we take all the positives aspects of the Conference development and substract all those little negative details, the balance is favorable and we all can be proud of the outcome, of this Conference. This result is the consequence of the active and enthusiastic participation of all of you, and the ample collaboration of the Organizing Committee members as well as many members of the Mexican Society on Soil Mechanics.

To mention all the names of those who collaborated with us, would mean to read a long list, but I consider it is of elemental justice to stand out some of them: Luis Ramirez

de Arellano, who carried on his shoulders the heaviest load and responsibility of the organization work. Also outstanding was the participation of Daniel Reséndiz in the Papers Subcommittee Luis Vieitez and Alfonso Rico in the Main Sessions and Specialty Sessions Subcommittees. Dr. Raúl Marsal, President of our Mexican Society on Soil Mechanics, who maintained alive the interest of all the members of this Society during the organization and development of our Conference.

Very important was, indeed, the economic support given to us by various governmental authorities through their different branch offices, besides the desinterested participation of many private Concerns, as well as the Companies participating in the exhibition that took place at the Unidad de Congresos del Centro Medico Nacional.

To all of them, I want to express the sincere gratitude of the Organizing Committee.

Very soon all of you will be in your way back home, taking along many souvenirs from México. On behalf of my Mexican colleagues too I would like to ask you to take with you the most valuable of our souvenirs, our friendship.

To all of you " Bon Voyage ".

L. BJERRUM

Mr. Gilberto Valenzuela, Minister of Public Works,  
Dear Mr. Tamez, President of the Organizing  
Committee,  
Ladies and Gentlemen:

This Conference has been a large-scale experiment on how a conference ought to be run - and one of the boldest experiments has been to sandwich between the cheese and the coffee the President's official report on the state of affairs of our Society.

Thirty-three years have elapsed since a small group of pioneers met together at Harvard. The organization which they created gathered momentum at such a rate that even the Mexican Organizing Committee was unable to know with any exactitude whether we would have 1800 at our opening session or maybe 2400!

We are so much indebted to these early pioneers that

I feel you would like me on your behalf to greet individually those of them who are with us to-night. I will call on them one by one, and on behalf of the Organizing Committee I have the pleasure to present to them a token of our gratitude

Spencer Buchanan  
Arthur Casagrande  
Leonard Cooling  
Jacob Feld  
Francisco Gómez-Pérez  
Benj. Hough  
Jerry Jennings  
Jörgen Osterberg  
Danna Leslie  
James Parsons  
Philip Rutledge  
Gregory Tschebotarioff  
Edward White

There are two great secrets which are normally revealed by the President at this stage. The first is the meeting-place for the next Conference, but splashed over this morning's papers you will have been happy to read that it is to be in Moscow. May I ask Professor Taytovich, who was largely responsible for this, to stand so that we can congratulate him in person.

Perhaps four years from now we shall be having our final banquet in Kremlin, having feasted the previous evening on a performance of Swan Lake by the Bolshoi.

Next, I want to greet our ladies. One of the main purposes of our large international meetings is to bind together soils engineers the world over into one big family. Admittedly we accomplish something of this at our technical meetings - but the results are barely worth mentioning compared with what is achieved due to the presence of our lady-folk. I believe that they reduce the friction among us to zero while at the same time the cementing bonds increase to a maximum. We can express it by the new soil mechanics concept:

$$\varphi' \rightarrow 0, c' \rightarrow \infty$$

At the same time I want to thank on their behalf the Ladies Committee who under Mrs. Yolanda de Taméz organized such splendid and interesting visits for them.

To-night my right arm should really be in a sling - so many people have congratulated me on the success of the conference. Everything went beautifully and I know you will all be behind me when I turn my thanks to those who really deserve the credit.

Let me first thank the Government of Mexico represented here by the Minister, and all those sponsors who economically made this Conference possible.

Dear Mr. Taméz: on behalf of every participant I express a warm and deeply felt thanks for the magnificent organization of this conference, for the hospitality we have met, and for the feeling of warm friendship we have sensed around us since we arrived.

I know that the organization of such an affair is a most demanding job - and this time it became no easier due to the fact that new procedures were tried out. These have proved a success and I owe you a personal debt of thanks for your willingness to experiment. But perhaps as a foot-note I may be permitted

to observe that in my opinion you went slightly too far in your experimentation when, in order to study how a conference can adjust to the lack of technical appliances, you cut out the power-supply to the City of Mexico.

To be the daily Secretary of the Organizing Committee means to shoulder problems which would kill any normal man - or least would make his hair fall out. Here Mr. Ramirez de Arellano, our beloved Secretary started at a distinct advantage - in fact, he looks every bit as well in this respect as he did in Montreal. But I can assure you that he has personally had the load of three or four on his shoulders. I would like Professor Taméz and Mr. Ramirez de Arellano to stand so that we can all express our warm appreciation to both of them.

It is said, I am told, that Professor Marsal has only once in 20 years removed his pipe from his mouth, and that was when the great earthquake of 1957 struck Mexico City. As President of the Mexican National Society he carries the responsibility for our presence here. How admirable that such a man, in addition to his conference duties, should personally have taken responsibility for the running of two specialty sessions, and in addition writing between times a book on the subsoil of Mexico City.

At the end of my talk I have the pleasure only of thanking all the Officers of the International Society for their valuable help over the past four years: our Past-Presidents, Vice-Presidents and the representatives of the National Societies. Let me also thank those who contributed to the success of the conference by acting as General Reporters, Panel Members, organizers and chairmen of Specialty Sessions. You did a good job,

Then I should introduce to you our new Secretary General, Kevin Nash. On retiring from the position of President I can feel that I did at least one good job which was to establish the post of Secretary General and to persuade Kevin Nash to take it on.

And finally, the second great surprise which I should be springing on you; that is the name of our new President which (as you all know) is Dr. Ralph Peck.

Ralph Peck was born in 1912, which coincided roughly with the time when the Geotechnical Commission of the Swedish Railways started to investigate the many landslides which accompanied the construction of railways on soft clay. He entered primary school at about the time when Terzaghi carried out his first soils experiments in Istanbul. He graduated from Renseelaer Polytechnic Institute in 1937, probably happily ignorant about the existence of soil mechanics.

He had already embarked on a most promising career as a bridge engineer when he ran into Dr. Terzaghi and Dr. Casagrande at Harvard University, and his confrontation with these two personalities made him a pioneer in the field of soil mechanics and foundation engineering.

The story reads like a fairy-tale by my countryman Hans Andersen. It started when the great father of Soil Mechanics, Karl Terzaghi, caught sight of the young student Peck and decided to make him his personal resident assistant on the construction of the Chicago Subway. This job over, Terzaghi chose him as his co-author of 'Soil Mechanics and Engin-

earing Practice'.

He started his brilliant career as teacher at the University of Illinois in 1942, and it is my guess that he must have taught soil mechanics to more students than any other person, and wherever he goes in this world he finds small societies of old students who feature him as their "fan".

His honours are numerous; let me just mention that he was among the first civil engineers to be elected into the new US Academy of Engineering. He was the first Terzaghi lecturer and this spring many listened to his fascinating Rankine Lecture at the Institution of Civil Engineers in London.

To say it simply: Our Society could not possibly have found a better President and in his good hands I know our Society will go from strength to strength.

R. E. PECK

Mr. Secretary; Mr. President; Ladies and Gentlemen:

It is an honor and a challenge to have been elected President of our Society, and I wish to thank all of you for the confidence you have shown me.

But I have some personal misgivings at being elected President after Dr. Bjerrum's Presidency.

As you all know, President Bjerrum has been an efficient president and a ceaseless worker. His multiple activities have without doubt, led to the progress of our Society and I wish that we all acknowledge his tremendous success as president. He has been an excellent president and we should all thank him most warmly for this.

J. KERISEL

M. le Ministre; Mesdames; Messieurs:

Je voudrais m'associer aux paroles prononcées par M. Le Président Bjerrum et remercier au nom de tous les congressistes d'expression française les organisateurs de cette conférence.

En tant que Président du Comité de Définitions et Symboles je me trouve dans une situation délicate car je ne trouve pas la façon adéquate de remercier tous ce qui ont contribué à la bonne marche des travaux.

Nous nous trouvons dans ce lieu historique qui est le dernier point de reunion de notre Congrès. Ce congrès a été harmonieux et couronné de succès.

Je voudrais remercier tout d'abord les dames mexicaines qui ont été des hôtes aimables.

La conférence a été un succès autant dans les séances plénières que dans les séances spéciales.

Je suis certain que nous emporterons de Mexico un souvenir agréable de son architecture, de ses travaux, de son métro, et de l'audace de ses travaux surtout dans le domaine des fondations.

Finale<sup>ment</sup> je voudrais remercier particulièrement M. Taméz.

G. VALENZUELA

Señor Presidente del Séptimo Congreso Internacional de Mecánica de Suelos e Ingeniería de Cimentaciones; Distinguidos Congressistas; Señoras y Señores.

Me complace, profundamente, asistir a este ágape de despedida del VII Congreso Internacional de Mecánica de Suelos e Ingeniería de Cimentaciones, pues he tenido oportunidad de enterarme de la magnífica organización de este evento, de las valiosas ponencias que se presentaron durante el mismo, así como del elevado nivel técnico en que sus trabajos se desarrollaron, razón por la cual les expreso mi sincera y calurosa felicitación.

Si el suelo, como elemento primordial de nuestro planeta, es el sustento fundamental del ser humano, y el mayor escenario en que se proyecta y se integra en la vida, lógico es que aspire a conocerla, a dominarla, a aprovecharse de sus frutos, y a edificar sobre ella. En el futuro, quizás no transcurra mucho tiempo, el hombre estará en posibilidad de construir sobre el suelo de otros mundos que forman, como el que habitamos, átomos pequeñísimos del universo. ¿Preparemos a las nuevas generaciones para evento singular! ¿Leguemos los conocimientos científicos que han hecho posible el triunfo del hombre sobre los obstáculos que presentan los suelos en que se sustentan las presas, puentes, aeropuertos, carreteras, ferrocarriles, habitaciones, etc. que promueven el bienestar y la felicidad humanas!

En nuestra época, en que parece que el hombre ha conquistado el poder de la ubicuidad, merced a los maravillosos medios de transporte que ha ingeniado, revisten singular importancia los Congresos Internacionales que felizmente se realizan con frecuencia en todos los países, especialmente por el valioso fructífero intercambio de experiencias que coadyuvan decisivamente al progreso científico y técnico de nuestra época. Pero estimamos que no solo debe computarse este aspecto, sino que debe destacarse, muy señaladamente, que estas interesantes reuniones prohijan el estrechamiento de las relaciones humanas, el conocimiento personal de los científicos y técnicos, y, esencialmente, la amistad entre los hombres que, a fin de cuentas, es el móvil que auspicia las acciones más valiosas que confluyen al progreso de los pueblos.

Como ingeniero, a la vez responsable de una función pública, y como mexicano, constituye para mí una honda satisfacción expresarles mi cordial saludo a los distinguidos congressistas extranjeros que han escogido a México, para

dialogar sobre los problemas que atañen a la disciplina que es objeto principal de sus afanes científicos.

Finalment, señoras y señores, me es muy grato expresarles, no palabras de despedida, sino mi invitación sincera para que todos ustedes visiten con frecuencia a este país, que han honrado con su amable presencia, y que, como siempre, habrá de recibirlos con los brazos abiertos. Muchas gracias.

Mr. President of the Seventh International Congress on Soil Mechanics and Foundation Engineering; Distinguished Congressmen; Ladies and Gentlemen:

It gives me great pleasure to attend this farewell dinner of the VII International Congress on Soil Mechanics and Foundations Engineering, for I have been informed of the magnificent organization of this event, of the valuable papers presented, as well as of the high technical level in which its activities were carried out, for which I wish to extend to you my warmest congratulations.

If soil, as a primary element of our planet, is the fundamental basis of the human being, and the principal scenery on which he develops himself, it is logical for him to wish to understand it, dominate it, benefit on its products, and build upon it. In the future - perhaps not too distant - man may be able to build on the soil of other worlds that constitute, like the one we live in, small atoms of the universe. Let us prepare the new generations for such an outstanding event! Let us leave them, as a heritage, the scientific knowledge that has made possible man's triumph over the obstacles presented by soil supporting dams, bridges, airports, highways, railroads, buildings, etc., that promote human welfare and happiness!

In our era, where man seems to have gained the power of ubiquity, due to the marvellous transport media he has devised, International Congresses, that fortunately are held in different countries, have a unique importance, especially due to the valuable interchange of experiences that contribute to the scientific and technical progress of our age. But we feel that not only this aspect should be considered, but the fact should be emphasized that these interesting gatherings also promote closer human bonds among scientists and technicians, and essentially, friendship between men that, in ultimate analysis, is the motivation that sparks the most valuable actions for the progress of peoples.

As an engineer, as public administrator, and as a Mexican, I am deeply honored to express a cordial greeting to the distinguished foreign congressmen that have chosen Mexico to exchange experiences and ideas about the problems related with the field that is the main object of your scientific toils.

Finally, ladies and gentlemen, it gives me great pleasure to extend to you, not a fare-

well address, but my sincere invitation to come back to this country that you have honored with your presence and that, as always, will receive everyone with open arms. Thank you.

Monsieur le Président du Septième Congrès International de Mécanique des Sols et des Travaux de Fondations; Mesdames et Messieurs:

C'est avec une joie profonde que j'assiste à cette agape de clôture du VIIème Congrès International de Mécanique des Sols et des Travaux de Fondations où j'ai eu l'occasion de me rendre compte de la magnifique organisation de cet événement, de la qualité incomparable des travaux scientifiques présentés par Messieurs les Congressistes de tous les pays ainsi que du haut niveau scientifique dans lequel se sont déroulés ces travaux. Pour toutes ces raisons permettez - moi de vous adresser mes plus sincères et chaleureuses félicitations.

Si le sol, comme élément primordial de notre planète, est le soutien fondamental de l'être humain et la grande scène où il se projette et s'intègre dans la vie, il est logique qu'il aspire à la connaître, à la dominer, à profiter de ses fruits, à bâtir sur elle. Probablement, dans un avenir très proche, l'homme sera en état de construire sur le sol des autres mondes qui constituent comme le nôtre, des atomes infinitésimaux de l'univers. Préparons donc les nouvelles générations à cet événement singulier! Liguons - leur les connaissances scientifiques qui ont fait possible le triomphe de l'homme sur les obstacles que présentent les sols qui supportent nos barrages, nos ponts, nos aéroports, nos routes, nos chemins-de-fer, nos maisons, etc, et qui sont à la base du bien-être et du bonheur humains.

A notre époque, où l'homme paraît avoir conquis le pouvoir d'ubiquité grâce aux merveilleux moyens de transport qu'il a génialement inventés, les Congrès Internationaux qui se réalisent avec fréquence dans tous les pays du monde, revêtent une importance singulière à cause, spécialement, des échanges précieux et fructueux qui contribuent, d'une manière décisive, au progrès scientifique et technique de notre époque. Cependant, nous estimons qu'on ne doit pas prendre en considération uniquement cet aspect mais qu'on doit surtout mettre en évidence combien ces intéressantes réunions contribuent à rendre plus étroites les relations humaines, à mettre en contact personnel les hommes de science et les techniciens de tous les pays et surtout, essentiellement, ces réunions rendent possible l'amitié entre les hommes, ce qui, en fin de compte, est le mobile et le moteur des actions les plus enrichissantes des hommes, indispensables au progrès des peuples.

En tant qu'ingénieur et responsable d'une fonction publique et aussi en ma qualité de Mexicain, j'éprouve une profonde satisfaction en adressant mon salut le plus cordial aux distingués congressistes étrangers qui ont

choisi Mexico pour dialoguer sur les problèmes qui concernent les disciplines qui font l'objet principal de nos intérêts scientifiques.

En arrivant a la fin de mon discours, Mesdames et Messieurs je désire, non pas vous dire adieu, mais vous prier d'accepter mon invitation la plus sincère pour que vous reveniez, le plus souvent possible, visiter ce pays que vous venez d'honorer de votre présence et où vous serez toujours reçus les bras ouverts. Merci.

MRS. L GURI

On behalf of all Spanish-speaking ladies, I would like to compliment and thank all the attentions we have received from our Mexican sisters.

Their watchfulness after us has topped anything we could imagine and, to our guardian angels, we want to tell that we look forward for the day in which we will be able to open wide our homes and our hearts as they made

with us.

Remain all of you, Mexicans, in the certainty that as the song goes:

"There is nothing else like Mexico, not in the whole wide world....."

MRS. MANAN

On behalf of all the ladies from the United States I would like to thank all the mexican ladies who have acted as our guides and hostesses during this congress and who have shown us so much history and so much beauty in such a limited time. They have done this always with a smile.

I have thanked all the ladies but I wish to thank also their husbands who together have opened the doors of their homes to us.

You can be certain that if you ever come to Indianapolis, Indiana we shall also receive you with open arms. Thank you.



## Errata

<u>Reference</u>	<u>Comments</u>
2 Par. 1.1 (2)	Change <u>horse back</u> to horseback
3 line 21	Change <u>mugh</u> to <u>much</u>
3 par. 1.4 (3 line 18)	Change <u>or</u> to <u>of</u>
4 Right Col, line 16	Change <u>Waialua</u> to <u>Wahiawa</u>
6 par. 2.2 line 7	Change <u>stero-pairs</u> to <u>stereo-pairs</u>
6 par. 1, line 6	Change (Wat. Exp. Sta, 1947) to (Progress Report, 1947)
9 par. 1, line 12	Add a comma after required,
10 right col, line 8	Change <u>inadequacy</u> to <u>inadequacies</u>
11 last par., right col	Change (Corps of Engineers, 1966) to (Inspection Manual, 1966)
13 par. 3.3, line 5	Change <u>reserach</u> to <u>research</u>
14 par. 2	Change to (Zeller and Wullimann, 1957)
15 line 1	Change date from 1964 to 1963
16 par. 2, line 6	Change to read ---internal friction, and (2) a care-
18 par. 4.2 line 1 par. 4.2 line 4 and 5	Change <u>set forth by the</u> to <u>customarily used by the</u> Delete entire reference in parenthesis. add period.
19 Right Col., lines 4 and 5 from end	Add period after materials. Delete entire reference
20 Right Col., line 2	Delete <u>approach to analyze the time-history</u>
26 Table VI	Terzaghi Dam, change reference from <u>1968</u> to <u>1967</u>
"	Change 4th project to read Notre-Dame de etc.
26 Right Col. line 5	Change <u>firm</u> to <u>firms</u>
28 Table VII	Change 2nd project to read Manicougan 2 <u>Dam</u>
29 Right Col. last par., line 1	Change <u>Tortoles</u> to <u>Tortolas</u>
30 Figs. 26 & 27	Change spelling in captions to read <u>Tortolas</u>

<u>Reference</u>	<u>Comments</u>
31 Right Col, 2nd par.	Change reference to read (Golder and <u>Bazett</u> , 1967)
34 Right Col. 2nd par., line 2	Spelling should be <u>Netzhualcoyotl</u>
34 Right Col. 3rd par., line 7	Spelling should be <u>phenomenon</u>
34 Right Col. last line	Spelling should be <u>presumably</u>
34 Fig. 31	Reference should be to (After Marsal and <u>Ramirez</u> de Arellano, 1967)
36 Par. 4.5.2 line 22	Change date from (1961) to <u>(1962)</u>
36 Par. 4.5.2 line 27	Change date from (1961) to <u>(1965)</u>
37 2nd line from bottom	Change spelling to (Olivier, 1967)
44 Right Col, line 14	Change <u>Cherry</u> Dam to <u>Cheney Dam</u>
46 Par. 3, line 9	Change reference to read (Binnie et.al., 1967)
48 Par. 6.3.1, 2nd par., line 11	Add apostrophe, <u>contractor's</u>
52 Right Col. line 1	Refer to Marsal and Ramirez <u>de Arellano</u>
55 Right Col. line 3	Refer to Marsal and Ramirez <u>de Arellano</u>
60 Fig. 58	Refer to Marsal and Ramirez <u>de Arellano</u>
61 Fig. 66	Refer to Marsal and Ramirez <u>de Arellano</u>
68 Par. 10 (a) line 4	Spelling <u>undesirable</u>
69 3rd par., line 3	Change built <u>as</u> sites to <u>built at sites</u>
69 3rd par., line 10	Change <u>that occurrence</u> to <u>those occurrences</u>
78	Add the following reference:  Hall, E.B., and Gordon, B.B., "Triaxial Testing With Large Scale High Pressure Equipment," <u>Laboratory Shear Testing of Soils</u> , American Society for Testing and Materials, Philadelphia, Pa., STP 361, 1963, pp. 315-328.
79	Add the following reference:  Jones, J.C., "Deep Cut-offs in Impervious Alluvium Combining Slurry Trenches and Grouting", <u>Transactions</u> , 9th International Congress on Large Dams, Istanbul, 1967, Vol. 1, pp. 509-524.

Reference

Comments

- 80 Add the following reference:
- Lowe, J. , "Stability Analysis of Embankments" , Journal of the Soil Mechanics and Foundations Division, American Society of Civil Engineers, Vol. 93, No. SM4, Proc. Paper 5305 , July, 1967 . pp. 1-33.
- 81 Add the following reference:
- Newmark, N.M. , "Earthquake Effects on Dams and Embankments," presented at the Structural Engineering Conference, American Society of Civil Engineers, San Francisco, Calif., Oct. , 1963.
- 82 Reference to O'Neill
- Change date of STP 351 from 1964 to 1963
- Add the following references:
- Peck, R.B. , "Statements of Conclusions by the General Reporters, Division G," Proceedings , 6th International Conference on Soil Mechanics and Foundation Engineering, Montreal, Vol. 3, 1965, p. 596
- Ripley, C.F. , "Portage Mountain Dam, I: An Outline of the Project," Canadian Geotechnical Journal, Vol. 4, No. 2, May, 1967, pp. 125-141
- 83 Reference to Ripley, line 4
- Delete first 1964 after Edinburgh

## VOLUME I

Page 122, Fig. 1: 6 full circles should be changed into open ones, according to Figs. 2 and 3.

Page 135, left-hand column: equation (3) should read  $\frac{2\sigma_x - \sigma_y - \sigma_z}{3} \quad \tau_{yx} \quad \tau_{zx}$

Page 136, left-hand column: equation (10) should read  $\epsilon_{oct} = \frac{1}{3} (\epsilon_1 + 2\epsilon_3)$

Page 143, Synopsis: line 3 should read "(1969)"

Page 143, right-hand column: last line should read " $\sigma_z$  = vertical stress".

Page 144, left-hand column: line 17 should read  $\frac{E_1}{E_2} (-), - \left(\frac{h}{a}\right)$

Page 145, right-hand column: line 4 should read  $\nu \left(\frac{h}{a} < \frac{E_1}{E_2} < 5\right) (-),$

Page 150, left-hand column: first reference should read "Gerrard, C.M. (1969) - — traffic loadings. Special Report No. 3 Aust. Rd Res. Bd, Melbourne."

Page 160, left column: line 13 should read "escalating step function - the envelope.."

Page 185, Fig. 5: should read "Uniaxial Consolidation."

Page 186, Fig. 6: should read "Uniaxial Consolidation."

Page 187, Fig. 7: should read "Uniaxial Consolidation."

Page 297, Heading: should read "STRESS-STRAIN-TIME BEHAVIOR"

Page 298, right-hand column: line 16 should read "applied by a stress ratio z"

Page 302, left-hand column: equation (21) should read  $W = \frac{1}{4} \cos \frac{\theta + \delta}{2}$

Page 302, right-hand column

line 2 should read "As the mobilization".

line 2 from the bottom should read "mobilization of particles, clay particles are"

Page 304, right-hand column: lines 9 to 11 omit "Comparing this relation -----well agreement".

Page 379, Heading should read "POTENTIAL AND CREEP RUPTURE OF SOILS"

Page 403, right-hand column: line 30 add "pore pressure" after "the change in".

Page 406, Fig. 7: stress-strain loops. Numbers shown on the axis of Shear Stress should be divided by two.

## VOLUME II

Page 11, Fig. 4b: should read  $C_v \cdot 10^{-3} \text{ cm}^2/\text{sec}.$

Page 14, left-hand column: equation should read

$$s' = \frac{87}{100} \quad s = \frac{87}{100} \quad 5.30 = 4.62 \text{ cm}$$

Page 27, right-hand column

line 13 should read "In two papers (Johannessen and Bjerrum, 1965,".

line 26 "table" should read  
ground pile  
cm cm

Page 32, left-hand column: line 15 should read "260 tons".

Page 36, Fig. 3: ajouter Nota - pour les 3 remblais, la nappe se trouve sensiblement au niveau initial du terrain naturel.

Page 41, colonne de droite

ligne 13, au lieu de "Bien que les valeurs ----- a Narbonne 5,20m)".  
lire "Les valeurs a comparer sont essez différentes et certains resultats pa -  
raissent aberrants (valeurs trouvées a Palavas 2ème phase 7m et à Narbonne 5,20m).

tableau IV lire "α en place"

- 1,85
- 1,73
- 1,54
- 0,16
- 0,37
- 0,77
- 1,22
- 0,71
- 0,75

avant dernière ligne lire "xial, ces premiers résultats laissent espérer une solution possible"

Page 43, Fig. 12a: ajouter sous l'axe des abscisses "distance en m du piézomètre à l'axe du drain".

Page 54, Fig. 1. it is reversed.

Page 55, left-hand column: line 7 should read "with a layer of wax to prevent possible loss of moisture by evaporation."

Page 117, Fig. 2a: last line should read

$$\frac{z_j}{n_o}$$

Page 296, Table 1: 6th line from the bottom, should be deleted "12.3 for water content (w)" and "117 dry density (yd)".

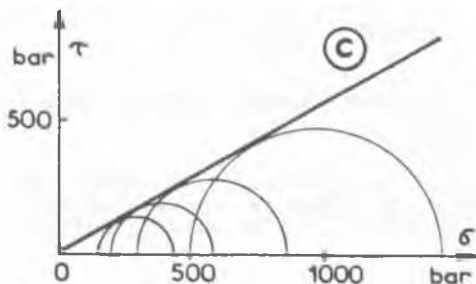
Page 385, right-hand column: lines 33-45 refer<sub>ences</sub> should read in this order (1), (4), (5), (6), (3) and (2).

Page 397, Heading

title in french should read "BLOCS DE SABLE CIMENT EN..."

after authors names should read "Koninklijke Nederlandsche Heidemaatschap-pij, Arnhem, Netherlands".

Page 427, Fig. 5c: remplacer par la figure suivante



Page 431, colonne de droite: remplacer les lignes 10 a 15 par "simple, ce sont donc surtout les conditions d'exécution qui rencontrant de grandes difficultés. En supposant le probleme résolu, la stabilité définitive des ouvrages parait facile a assurer, sans qu'il soit nécessaire de recourir a des formes de cavité ou des épaisseurs de béton exceptionnelles. Mais l'abandon du projet n'a pas permis de résoudre complètement les problemes pra - tiques".

Page 435, left-hand column: equation (5)

should read 
$$U(\xi) \pm 0 = \pm \frac{h(1+\nu^2)}{2E} \sum_{i=0}^4 d_i \xi^i$$

Page 441, right-hand column: line 47 should read "N° 3".

Page 533, left-hand column: line 14 should read "can exceed 90m."

Page 533, right-hand column: line 4 should read "Bjerrum (1954 b)."

Page 536, left-hand column: line 25 should read "clay or precipitate as nearly insoluble compounds".

Page 537, Fig. 7b: should read "elevation above sea level 120, 140, 160 180".

Page 538, left-hand column: line 51 should read "cutting of the order of 3m can be expected when".

STATE-OF-THE-ART REPORT

V. F. B. De Mello

Page 53, right-hand column: line 40 should read  $(40 + 5.0) \gamma D$  to  $(40 + 5.0 \phi)$

Page 54, left-hand column; line 17 should read "increase with depth".

Page 54, righthand column: line 10 should read "wherein".

Page 55, right-hand column: line 5 should read "Sc = 1 + 0.2 N phi B/L"

Page 57, right-hand column: line 11 should read "pacity formulas have been concomitantly".

Page 65, right-hand column: line 19 should read "of failure conditions, appropriate"

Page 71, left-hand column

line 31 should read "to soils under the assumption of the Linear"

line 47 should read "s + c + sigma tan phi. As is well-known, if".

Page 71, right-hand column: line 1 should read "may be three different values at

play".

Page 73, right-hand column: line 9 should read "Mayer and Habib (1951), Habib and Suklje".

Page 75, right-hand column: line 46 should read "to the product of the lateral surface  $A_B$ ".

Page 76, left-hand column: line 4 from bottom should read " $\beta = 0.5$  in sensitive clays shortly after".

Page 79, right-hand column: line 2 should read "predicted by theories of elasticity".

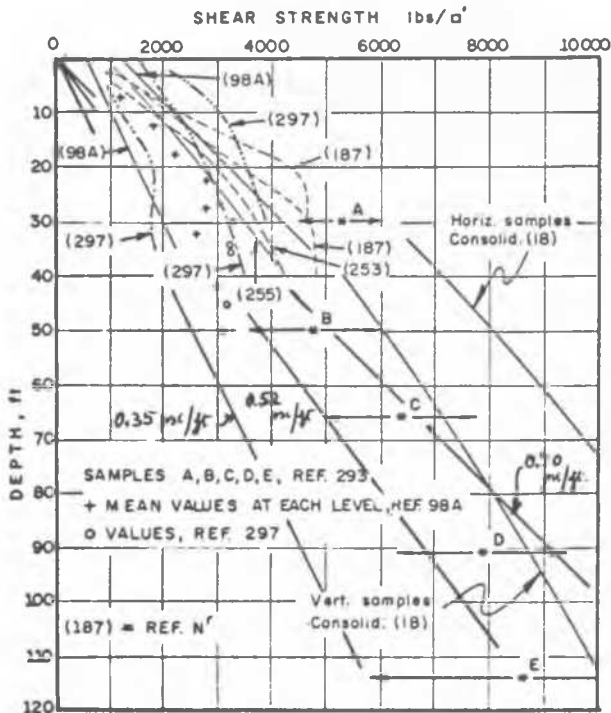
Page 80, left-hand column  
line 4 should read "the mechanical properties of soils and, to pile surrounding soil"  
line 12 from bottom should read "sions for the load-deflection characteristics".

Page 80, right-hand column: line 13 from the bottom should read "teraction is implicitly accepted to have".

Page 82, right-hand column: line 7 should read "that a soil allowed to consolidate partly".

Page 83, left-hand column: line 36 should read "indications, from which it will be justified".

Page 84, Fig. 16: superpose the three lines mentioned at end of first paragraph, left of page 85.



Page 86, right-hand column: line 5 from bottom should read "coincidence of the minimum  $d f/dz$  to  $d T f/dz$ ".

Page 87, right-hand column: line 21 should read "of the soil: Through appropriate formulas,".

Page 88, right-hand column: line 12 should read "under item 2.5.2. to the better documented".

Page 89, left-hand column: line 33 should read "the ultimate load  $p_{90} = 0.04 B$ ,  $B$  being".

Page 89, right-hand column: line 9 should read "item 2.5.2. may be qualified through interpretations".

Page 90, right-hand column: line 19 should read "cussed under item 2.6.1".

Page 91, left-hand column: line 6 from bottom should read "may be subjected to misuse, despite the log".

Page 92, right-hand column: line 2 from bottom should read "Delete parenthesis) at the end of line .

Page 95, right-hand column: line 42 should read "capacity factors  $N'_c$ ,  $N'_q$  and  $N'_\gamma$  were established".

Page 96, left-hand column: line 7 from bottom should read "straight line vs  $\sqrt{t}$  and following at some".

Page 98, left-hand column: line 6 from bottom should read "Since the direct determination of  $E$  and  $\mu$ ".

Page 99, left-hand column: line 12 close bracket ] after equation.

Page 100, left-hand column: line 16 should read "difficulties in choosing few "representative".

Page 105, left-hand column: line 24 from bottom should read "in part as an exponential function of time:".

Page 107, left-hand column: line 26 should read "and B coefficients were postulated make".

Page 112, right-hand column: line 23 should read "12d, 18d, 24d, 30d, for a single 2 array to  $3^2$ ".

Page 113, right-hand column: line 2 from bottom should read "subsoil profile comprising and upper clay".

Page 114, right-hand column: line 7 should read "fine silty sand, two sets of tests on four".

Page 115, left-hand column

line 18 should read "tions R = right pile:  
EP = elastic"

line 11 from bottom should read "plicable  
also to endbearing conditions".

Page 115, right-hand column: line 7 from  
bottom should read "the use of overall ad  
hesion factors and".

Page 116, left-hand column: line 10 should  
read "to have the responsibility of permit  
ting a more rational".

Page 119, right-hand column: line 6 from  
bottom should read "below it the net move  
ment of the pile is of".

Page 120, right-hand column: line 15 from  
bottom should read "great number of inge  
nious ideas have been de-".

Page 123, right-hand column: line 34 should  
read "which ?) would adequately reflect  
the".

Page 125, left-hand column: line 23 should  
read "felt that only a sistematic reanaly  
sis of".

Page 125, right-hand column: line 17 should  
read "nir plus de données concernant le cas  
général".

R. B. Peck

Page 229, Table I: item 7 reference should  
read "Matich and Carling 1968".

Page 232, Fig. 2, should read "z = 28' "

Page 233, Table I

item 3, depth should read "z=28' "

add the following for second tunnel,  
26 ft. distant on centers: Av. Sett.  
Vol. 2.5%;  $\delta_{\max} = 0.63$  ft;  $\delta'_{\max} = 0.32$  ft.

Page 235, Table III

item 2, add Av. Sett. Vol. 0.9%

item 3, add Av. Sett. Vol. 3.7%

Fig. 3, should read "z ~36' ".

Page 237, Table IV

item 1, add Av. Sett. Vol. ~0.9%

item 3, change Av. Sett. Vol. from 0.2  
to 2.0%.

Page 241, Table V

item 2, change Av. Sett. Vol. from 4.3 to  
1.9%

item 7, replace values 0.6, 0.09, 0.05, by  
1.7, 0.23, 0.16

item 7, replace values 0.4<sup>d</sup>, 0.17<sup>d</sup>, 0.12<sup>d</sup>,  
by 1.3, 0.33, 0.25.

Page 242, Fig. 9: change point 4 in accord  
ance with change in item 4, Table VI.

Page 243, Table VI

item 4, change i/R from 1.0 to 2.0

item 9, change 0.075, 3, 0.75 to 0.16, 7,  
1.7

item 10, change R form 52 to 26 ft.

Page 245, right-hand column: line 41 change  
Fig. 10 to Fig. 10a.

Page 249, Fig. 11a: should read

$$A = \frac{1}{2} \gamma z(1+K_0)R = p_0R$$

Page 249, right-hand column: line 12 from  
bottom replace heavy dash-dot by curved  
nearly vertical.

Page 250, Fig. 12a: horiz. axis should read  
"Time days (log scale)".

Page 251, Fig. 12b: horiz. axis should read  
"Time, days (log scale)".

Page 254, Fig. 13, horiz. axis should read  
" Time, days (log scale)".

Page 262, left-hand column: line 7 replace  
"soldier piles and lagging" by "closely  
spaced soldier piles without lagging".

Page 264, Fig. 2: last word in caption should  
be Strut.

Page 270, left-hand column: line 26  
the permanent wall was cast against the  
steel sheetpiling. There was no backfill.

Page 285, last line: add W.T. Jackson.

Page 288, last line: add pp. 60-74.

**SESSION ONE:****STRESS-DEFORMATION AND STRENGTH  
CHARACTERISTICS, INCLUDING TIME EFFECTS****PREMIERE SEANCE:****CARACTERISTIQUES CONTRAINTE-DEFORMATIONS  
ET RESISTANCE, COMPTE TENU DE L'INFLUENCE DU  
TEMPS****SEKTION EINS:****SPANNUNGSVERFORMUNG UND FESTIGKEITSVERHALTEN  
UNTER BERUICKSICHTIGUNG DER ZEIT****SESION UNO:****CARACTERISTICAS ESFUERZO-DEFORMACION Y  
RESISTENCIA, INCLUYENDO LOS EFECTOS DEL TIEMPO**

<p>R. J. BALLY, I. P. ANTONESCU and V. D. PERLEA Rumania</p>	<p>ON STRESS-STRAIN IN HIGHLY COMPRESSIBLE TRIPHASIC SOILS <i>SUR LA RELATION CONTRAINTE-DEFORMATION DANS LES SOLS TRIPHASES FORTEMENT COMPRESSIBLES</i> ÜBER DAS SPANNUNGS-DEHNUNGS-VERHÄLTNIS IN STARK ZUSAMMENDRÜCKBAREN DREIPHASIGEN BÖDEN <i>SOBRE LA RELACION ESFUERZO-DEFORMACION DE SUELOS TRIFASICOS DE ALTA COMPRESIBILIDAD</i></p>	<p>1</p>
<p>V. G. BEREZANTZEV, A. A. MUSTAFAYEV, N. N. SIDOROV, I. V. KOVALYOV and D. K. ALIEV U. S. S. R.</p>	<p>ON THE STRENGTH OF SOME SOILS <i>LA RESISTANCE DE CERTAINS SOLS</i> ÜBER DIE STANDFESTIGKEIT EINIGER BÖDEN <i>SOBRE LA RESISTENCIA DE ALGUNOS SUELOS</i></p>	<p>11</p>
<p>J. BIAREZ, J. BELLIER, J. L. BORDES, B. BOUCEK, L. LONG, M. ORLIAC et C. REMY France</p>	<p>MECHANICAL PROPERTIES OF SOILS UNDER VARIOUS STRESS CONDITIONS <i>PROPRIETES MECANIKES DES SOLS SOUS DIVERSES SOLLICITATIONS</i> MECHANISCHE EIGENSCHAFTEN VON BÖDEN UNTER VERSCHIEDENEN SPANNUNGSBEDINGUNGEN <i>PROPIEDADES MECANICAS DE SUELOS BAJO DIVERSAS SOLICITACIONES</i></p>	<p>21</p>
<p>A. W. BISHOP and H. T. LOVENBURY England</p>	<p>CREEP CHARACTERISTICS OF TWO UNDISTURBED CLAYS <i>CARACTERISTIQUES RHEOLOGIQUES DE DEUX ARGILES NON REMANIEES</i> KRIECHEIGENSCHAFTEN VON ZWEI UNGESTÖRTEN TONEN <i>CARACTERISTICAS REOLOGICAS DE DOS ARCILLAS INALTERADAS</i></p>	<p>29</p>
<p>G. E. BLIGHT South Africa</p>	<p>WASTE GYPSUM AS AN EMBANKMENT MATERIAL <i>GYPSE DE REBUT COMME REMBLAYAGE</i> AUSGELAUGTER GIPS ALS DAMM-SCHÜTT-MATERIAL <i>DESECHOS DE YESO COMO MATERIAL PARA TERRAPLENES</i></p>	<p>39</p>



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**SESSION TWO:  
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## REPORT FROM THE ORGANIZING COMMITTEE

### COMPTE RENDU DU COMITE D'ORGANISATION

#### 1. HISTORY AND ORGANIZATION OF THE CONFERENCE

The Executive Committee during its meetings in the Montreal Conference, chose by vote Mexico City as the place for the next International Conference. Also in Montreal, the Executive Committee appointed an Advisory Committee, with the purpose of advising the Organizing Committee in laying out plans for the Conference. The Advisory was integrated by the President, Past-Presidents and Vice-Presidents of the International Society.

The Mexican National Society appointed the Organizing Committee in October, 1965, under the chairmanship of Dr. Nabor Carrillo. In October 28, 1965, a letter was sent to all National Committees, requesting suggestions for the date to hold the Conference. The majority of replies favoured the last week of August, and accordingly, this was selected. Before the end of 1965, the Organizing Committee met several times to start discussing plans for the Conference. To this effect, suggestions received in Montreal were considered. It was soon decided that the Conference was to take place in the Unidad de Congresos del Centro Médico Nacional, on account of its excellent facilities for technical meetings.

During the time when plans for the Conference were being laid out, the Organizing Committee maintained in close contact and received valuable recommendations from the Advisory Committee and individually from several prominent members of the International Society. In particular, Dr. Laurits Bjerrum, President, and Prof. Arthur Casagrande, former President, provided invaluable advice on several occasions.

As a result of the above consultations, the Organizing Committee decided to introduce the following changes with respect to the format of previous conferences:

#### 1. HISTOIRE ET ORGANISATION DU CONGRES

Au cours du Congrès de Montréal, le Comité Directeur a élu la ville de Mexico comme Siège du prochain Congrès International. A Montréal également, le Comité Directeur a nommé un Comité Consultatif chargé de conseiller le Comité d'organisation pour toutes les questions relatives aux préparatifs de la réunion. Le Comité Consultatif comprenait le Président, les ex-Présidents, et les Vice-Présidents de la Société Internationale.

En octobre 1965, la Société Nationale Mexicaine a nommé un Comité d'organisation présidé par M. Nabor Carrillo. Le 28 octobre 1965, une lettre a été envoyée à toutes les Sociétés nationales a fin de solliciter leurs suggestions au sujet de la date du Congrès. La majorité d'entre eux ayant opté pour la dernière semaine d'août, cette période fut retenue. Le Comité d'organisation s'est réuni à plusieurs reprises avant la fin de l'année 1965, afin de commencer à discuter de la préparation du Congrès, sans négliger à cet égard, les suggestions reçues de Montréal. Il fut bientôt décidé que le Congrès aurait lieu à la Unidad de Congresos del Centro Médico Nacional, étant donné les facilités offertes par ce Centre pour les réunions techniques.

Pendant toute la période de préparation, le Comité d'organisation est resté en contact étroit avec le Comité Consultatif dont il a reçu d'excellentes recommandations, de même qu'avec divers membres éminents de la Société Internationale, en particulier avec M. Laurits Bjerrum, Président, et le Prof. Arthur Casagrande, ex-Président, qui lui ont fourni, à plusieurs reprises, de précieux conseils.

A la suite des échanges mentionnés ci-dessus, le Comité d'organisation décida d'introduire différents changements par rapport au déroulement des congrès antérieurs. Ces changements étaient les suivants:

- a. To hold technical meetings during five consecutive days in a single week
  - b. To abandon covering the whole field of soil mechanics with the subjects of the Main Sessions, and limit these to five, one for each day of technical activities
  - c. To provide facilities so that interested groups could meet in Specialty Sessions, several of which could be held simultaneously during four afternoons. These meetings were to be of experimental nature and designed so as to promote informal discussion of specialized topics by interested groups. The responsibility for these meetings was to be left entirely in the hands of their organizers
  - d. To decrease as much as possible the time elapsed between the deadline for submission of papers and the Conference. Accordingly, the Committee planned to produce both preprints in advance of the Conference, and subsequently the Proceedings, the latter with the format accustomed in previous conferences
  - e. To entrust the General Reporter of each Main Session, with the preparation of a State-of-the-Art paper, on the subject of his Session.
- a. Les réunions techniques auraient lieu en une seule semaine pendant cinq journées consécutives
  - b. On renonçait à couvrir l'ensemble de la Mécanique des Sols et les thèmes des Séances Principales seraient limités à cinq, soit un par jour
  - c. Les groupes intéressés auraient toutes les facilités voulues pour se rencontrer au cours de Séances Spéciales, dont plusieurs pourraient avoir lieu simultanément pendant quatre après-midi entiers. Ces réunions auraient un caractère expérimental et seraient destinées à encourager un libre échange d'idées sur des sujets spéciaux. L'initiative de ces réunions serait entièrement laissée aux organisateurs
  - d. On s'efforcera de réduire l'intervalle entre la date limite pour la remise des travaux et le Congrès. Dans ce but, le Comité décida d'établir les Comptes-Rendus en respectant le format habituel mais à partir d'imprimés réalisés avant le Congrès
  - e. Le Rapporteur Général de chaque Séance Principale serait chargé de préparer un Résumé des Connaissances sur le Thème correspondant.

On February 19, 1967, Dr. Nabor Carrillo passed away. His death meant a tremendous loss to the Organizing Committee, since he had been the original inspirer, promoter, and leader of the organizers. Afterwards, Mr. Enrique Tamez was appointed Chairman of the Committee. Mr. Luis Ramírez de Arellano served as Executive Secretary since the appointment of the Organizing Committee.

## 2. LANGUAGES AND INTERPRETATION

According to the Statutes of the International Society, the official languages were English and French. During the Conference, and in correspondence with Spanish-speaking Countries, Spanish was also used. Bulletins and issues of News were printed in the three languages.

The Organizing Committee thus provided simultaneous interpretation during the Main Sessions, among the three languages. Six interpreters were engaged, who received in advance training in soil mechanics terminology, through several briefing sessions. In addition, the Organizing Committee offered to the National Committees of Germany and the U.S.S.R. the technical facilities for translation from

Le 19 février 1967, le Dr. Nabor Carrillo est décédé. Sa disparition représenta une perte incalculable pour le Comité d'organisation dont il avait été, dès l'origine, l'inspirateur, le promoteur et le guide. La Présidence fut confiée à M. Enrique Tamez, tandis que M. Luis Ramírez de Arellano continuait à occuper le poste de Secrétaire Exécutif.

## 2. LANGUES ET INTERPRETATION

Conformément aux Statuts de la Société Internationale, les langues officielles étaient le français et l'anglais. Durant le Congrès et dans toute la correspondance avec les pays de langue hispanique, l'espagnol fut également utilisé. Bulletins et communiqués furent imprimés dans les trois langues. Le Comité d'organisation avait également prévu un service d'interprétation simultanée en français, anglais et espagnol; les six interprètes engagés ont suivi des séances d'entraînement afin de se familiariser avec la terminologie de la Mécanique des Sols. En outre, le Comité d'organisation a offert aux Sociétés nationales d'Allemagne et d'U.R.S.S., un service de traduction en russe et en allemand mais ces derniers ont décliné cette offre.

the three above languages into German and Russian respectively; these committees declined the offer.

The Organizing Committee did not provide interpretation for the Specialty Sessions. However, the Organizers of Sessions Nos. 14 and 15 had interpretation services at their expense.

### 3. BULLETINS

Bulletin N° 1, containing the preliminary program for the Conference, was distributed on October, 1967. Ten-thousand copies were printed and sent to the National Committees for distribution among their members. A pre-registration form was attached to each bulletin.

It was decided to print a Special Bulletin, containing detailed instructions for the presentation of papers to the Main Sessions and information about the recently instituted Specialty Sessions; on November, 1968, 5,000 copies of this bulletin were printed. A copy was sent to each pre-registered member of the Conference and additional ones to all National Committees. It was established in this bulletin that papers had to be submitted in special forms, designed to standardize presentation, thus enabling the printing of the preprints by direct photo-offset reproduction of the originals, as prepared by the authors. Enough copies of these forms were sent to all National Committees, for distribution among the authors of papers.

Bulletin N° 2, whose contents were similar to those of previous conferences, was mailed on April, 1969, to pre-registered members and to the National Committees; 5,000 copies of it were printed. This bulletin contained a final registration form, a form for requesting accommodation, and one for preliminary registration to tours outside Mexico City.

There was also a Bulletin on Technical Visits and Tours outside Mexico City, of which 4,000 copies were printed and was mailed out on July, 1969.

Finally, 4,000 copies were printed of the Bulletin on Specialty Sessions. It was mailed out on July, 1969.

All bulletins were sent by air mail.

In Mexico City, Conference members were provided with pamphlets in the three languages, describing the various technical visits.

L'interprétation simultanée n'avait pas été prévue pour les Séances Spéciales. Néanmoins, les organisateurs des Séances Nos. 14 et 15 avaient engagé des interprètes à leurs propres frais.

### 3. BULLETINS

Le Bulletin N° 1 contenant le programme préliminaire du Congrès a été publié en octobre 1967. Dix mille exemplaires de cette brochure ont été envoyés aux Sociétés nationales pour être distribués à leurs membres. A chaque bulletin était joint un formulaire d'inscription.

On décida en outre d'imprimer un Bulletin Spécial contenant des instructions détaillées au sujet de la présentation des travaux pour les Séances Principales ainsi que des renseignements sur les Séances Spéciales de création nouvelle; cinq mille exemplaires de ce Bulletin furent imprimés en novembre 1968 et distribués aux participants, à raison d'un exemplaire par congressiste déjà inscrit tandis que les Sociétés nationales en recevaient également un certain nombre. Il était stipulé dans ce Bulletin que les travaux devaient être rédigés sur des formulaires spéciaux, ceci dans le but d'uniformiser la présentation et de permettre ainsi la reproduction des originaux par photo-gravure (offset) et leur publication avant le Congrès. Ces formulaires furent envoyés à toutes les Sociétés nationales en nombre suffisant, aux fins de distribution à tous les auteurs de communications.

Le Bulletin N° 2, de type courant, a été tiré à cinq mille exemplaires et expédié en avril 1969 aux membres déjà inscrits ainsi qu'aux Sociétés nationales; ce Bulletin contenait un formulaire d'inscription définitive, un formulaire de demande de logement ainsi qu'une fiche d'inscription préliminaire pour les excursions hors de Mexico.

On imprima également en quatre mille exemplaires un Bulletin pour les Visites Techniques et les Excursions hors de Mexico, lequel fut envoyé en juillet 1969.

Enfin, le Bulletin concernant les Séances Spéciales fut tiré à quatre mille exemplaires et expédié en juillet 1969. Tous les bulletins ont été envoyés par avion.

A Mexico, les congressistes reçurent des brochures concernant les visites techniques, éditées dans les trois langues officielles.

#### 4. NEWS

In order to call the attention of members of the International Society on the coming Conference and provide miscellaneous information of interest to Conference participants, the Organizing Committee entrusted to Dr. R. J. Marsal and Dr. D. Reséndiz, the publication of a News bulletin. Six issues of it appeared before the Conference on the following dates: March, June, and November, 1968, and March, June, and July, 1969, which were airmailed to pre-registered members of the Conference and to the National Committees.

Starting at the opening of the Conference, on Monday, August 25, a daily News bulletin was prepared in English, French, and Spanish and distributed to all Conference Members at the Unidad de Congresos. Six issues were thus produced during the Conference.

#### 5. PROCEEDINGS

As mentioned in point 1 of this report, the Organizing Committee decided early to shorten as much as possible the time elapsed between the deadline for presentation of papers and the Conference. In fact, the deadline was established on the 1st of February, 1969, less than seven months before the opening of the Conference. It was also decided to print the State-of-the-Art papers prepared by the General Reporters in a separate volume. One thousand paper-bound extra copies of this volume were printed and made available to students before the Conference and subsequently to everyone.

The Advisory Committee proposed that the total number of papers pertaining the Main Sessions, to be printed, be limited to 125. This recommendation was based mainly on two facts: First, that the topics of the five Main Sessions did not cover the entire field of soil mechanics, and second, that the Specialty Sessions provided an adequate outlet for some of the potential contributions. The Organizing Committee tried to comply as much as possible. Finally, 146 papers were printed in the first two volumes of the Proceedings.

The original publication plans included the preparation of preprints, by direct photo-offset reproduction of the manuscripts, as sent by the National Committees, and after the Conference, the production of the Proceedings in the accustomed format and by conventional type-setting procedures. In order to standardize the presentation of the manuscripts to enable the production of the preprints, special forms were sent to all National Committees, for distribution to the authors of papers. In addition, the Special Bulletin contained very detailed instructions regarding the preparation of text, tables, and figures.

#### 4. NOUVELLES

Afin d'attirer l'attention des membres de la Société Internationale sur le prochain Congrès et de fournir aux participants des informations diverses, le Comité d'organisation chargea M. R. J. Marsal et M. D. Reséndiz de publier un bulletin d'actualités. Six numéros, correspondant aux mois de mars, juin, et novembre 1968 et à mars, juin et juillet 1969 ont été publiés avant le Congrès et expédiés par avion aux membres inscrits ainsi qu'aux Sociétés nationales.

Dès l'ouverture du Congrès, le lundi 25 août, un bulletin d'information quotidien a été distribué à la Unidad de Congresos à tous les participants. Six numéros de ce Bulletin ont paru pendant la durée du Congrès.

#### 5. COMPTE-RENDUS

Comme il a été signalé au paragraphe 1 de ce rapport, le Comité d'organisation a décidé de réduire au maximum le temps écoulé entre la date limite de remise des travaux et le Congrès. En fait, la date limite était fixée au 1er février 1969, c'est à dire moins de sept mois avant l'ouverture du Congrès. Il a été également décidé d'imprimer les Résumés des Connaissances préparés par les Rapporteurs Généraux dans un volume à part. Un millier d'exemplaires de cette brochure a été mis à la disposition des étudiants et du public avant le Congrès.

Le Comité Consultatif proposa de limiter à 125 le nombre total des communications correspondant aux Séances Principales qui seraient publiées. Cette recommandation était fondée essentiellement sur deux considérations: en premier lieu, les thèmes des cinq séances principales ne recouvraient pas l'ensemble de la Mécanique des Sols et, en second lieu, certaines contributions pouvaient être présentées lors des Séances Spéciales. Le Comité d'organisation s'efforça de publier le maximum de travaux. Finalement, 146 communications parurent dans les deux premiers volumes des Comptes-Rendus.

Le programme de publication initial comprenait la préparation d'imprimés, par reproduction directe (photo-offset) des manuscrits envoyés par les Sociétés nationales puis, après le Congrès, la publication des Comptes-Rendus, selon le format et la mise en pages habituels. Afin d'uniformiser la présentation des manuscrits et permettre ainsi la réalisation des imprimés, des formulaires spéciaux furent envoyés à toutes les Sociétés nationales, aux fins de distribution aux auteurs de communications. Par ailleurs, le Bulletin Spécial contenait des instructions très détaillées concernant la

The reaction of the authors of papers to the above requirements was so enthusiastic that the majority of papers, not only complied with the specifications, but had an excellent presentation. This unexpected and favorable situation made the Organizing Committee feel that a major change in its original publication plans was warranted, in view of the many advantages involved in such change, in spite of the proximity of the Conference. The following decisions were thus taken:

- a. To print the Proceedings by direct photo-offset reproduction of the manuscripts as received from the National Committees (actually, some improvements were made to several papers, specially in figures). The quality of the binding was to be kept as for previous conferences
- b. To maintain for the two papers volumes and the State-of-the-Art volume, the publication date originally set for the preprint, that is, July 1st and send them by air to overseas countries (in fact, the distribution to members already registered at that time, was started a week before)
- c. To reduce the price of the Proceedings and State-of-the-Art volume from \$600 Mex. Cy. (48 U.S.) to \$300 Mex. Cy. (24 U.S.) until the closure of the Conference (the price after the Conference was afterwards set at \$500 Mex. Cy., that is, 40 U.S.)
- d. To reduce the registration fees to the Conference by \$475 Mex. Cy. (38 U.S.). This appreciable reduction was possible due to the radical decrease in the cost of the Proceedings and to the suppression of the now unnecessary preprints. Members who sent the previously established fees were refunded in Mexico City by application; otherwise, refunds were mailed to the remaining participants, after the Conference.

The above decisions caused some controversy at the beginning, but were subsequently generally endorsed by the Membership. The Organizing Committee feels that the reduction in the price of the Proceedings will facilitate a wider distribution of the technical material produced by the International Society.

Volumes I and II contain 146 papers presented to the Main Sessions. The distribution of papers among the National Societies, as well as the previously established quotas, are shown in Table I.

The present volume has been produced by the

présentation du texte, des tables et des figures.

Non seulement les auteurs de travaux suivirent fidèlement les indications qui leur étaient fournies mais ils s'appliquèrent même à donner à leurs exposés une excellente présentation. Dans ces conditions, le Comité d'organisation put envisager de modifier son projet initial et ce, malgré la proximité du Congrès. On décida par conséquent de procéder de la manière suivante:

- a. Imprimer directement les Comptes-Rendus en reproduisant par photo-gravure (offset) les manuscrits envoyés par les Sociétés nationales, tout en conservant la même reliure que celle adoptée lors des Congrès antérieurs. (De légers changements furent apportés à certains travaux, principalement en ce qui concerne les figures)
- b. Maintenir la date du 1er juillet, fixée à l'origine pour la publication des imprimés, pour les deux volumes des Comptes-Rendus et le volume contenant les Résumés des Connaissances et envoyer ces ouvrages par avion aux pays d'outre-mer. (En fait, la distribution de ces documents aux membres déjà inscrits commença une semaine avant cette date)
- c. Fixer le prix de vente des Comptes-Rendus et du volume des Résumés des Connaissances à 300 pesos mexicains (24 dollars) au lieu de 600 pesos (48 dollars) jusqu'à la clôture du Congrès. (Après celui-ci, le prix de vente serait fixé à 500 pesos soit 40 dollars).
- d. Fixer le prix de l'inscription au Congrès à 475 pesos mexicains (38 dollars). Cette réduction appréciable devenait possible grâce à la diminution radicale du prix de revient de la publication des Comptes-Rendus par suite de la suppression des imprimés devenus inutiles. Les membres ayant réglé à l'avance les montants établis à l'origine ont été remboursés sur demande à Mexico même. Dans les autres cas, les remboursements ont été expédiés aux participants après le Congrès.

Après avoir fait l'objet de quelques discussions, les décisions mentionnées ci-dessus ont été généralement admises par la suite, par l'ensemble des membres. Le Comité d'organisation pense que la réduction du prix de revient des Comptes-Rendus facilitera une plus large distribution des publications de la Société Internationale.

photo-offset procedure, reproducing material presented by the General Reporters, the authors of discussions, the Secretariat of the International Society, the organizers of the Specialty Sessions, and the Organizing Committee itself. An effort has been made to speed up its publication.

Three thousand five hundred copies of the Proceedings were printed and bound. Of these, 1,980 were distributed before the end of the Conference. Subsequently, the Proceedings are being sold by:

SOCIEDAD MEXICANA DE MECANICA DE SUELOS, A.C.  
Apartado Postal 8200  
México 1, D.F. MEXICO

Booksellers' orders will be handled by:

DISTRIBUIDORA DE LIBROS UNIVERSITARIOS  
Insurgentes Sur 299  
México 11, D.F. MEXICO

In accordance with a decision taken by the Executive Committee in Montreal, two copies of a paper-bound volume containing the abstracts of all papers accepted for the Main Sessions, were airmailed to all National Committees at the beginning of May, 1969.

#### 6. CONFERENCE PARTICIPATION

Table II gives the detailed distribution of participants in the Conference.

#### 7. EXECUTIVE COMMITTEE

The Executive Committee of the International Society met on the 22 and 23 of August, in Auditorium N° 3 of the Unidad de Congresos, under the chairmanship of Dr. Laurits Bjerrum. Each Member Country was represented by two delegates. The list of delegates and the minutes of the meetings are printed in this volume, pages 13 to 33. The Organizing Committee provided simultaneous interpretation and secretarial services. The draft of the minutes of each meeting was distributed to delegates on the following day, and the final version, in English and French, was ready before the end of the Conference.

#### 8. MAIN SESSIONS

The General Reporters were appointed on July 26, 1967; the Panelists on November 25, 1968, and Session Chairmen on November 29, 1968. There was a good deal of correspondence between the Organizing Committee and participants in the sessions, prior to the Conference. In addition the Chairman and later on the Execu-

Les volumes I et II contiennent 146 travaux présentés aux Séances Principales. La distribution des travaux aux Sociétés nationales ainsi que les tarifs originaux sont indiqués à la Table I.

Le présent volume réalisé selon le procédé de photo-gravure, contient les exposés présentés par les Rapporteurs Généraux, les auteurs de rapports, le Secrétariat de la Société Internationale, les organisateurs de Séances Spéciales, et le Comité d'organisation lui-même. On s'est efforcé d'en accélérer la publication.

Trois mille cinq cents exemplaires des Comptes Rendus ont été imprimés et reliés. Sur ce nombre, 1980 ont été distribués avant le Congrès. Actuellement, les Comptes-Rendus sont mis en vente par:

SOCIEDAD MEXICANA DE MECANICA DE SUELOS, A.C.  
Apartado Postal 8200  
México 1, D.F. MEXICO

Les libraires devront adresser leurs commandes à:

DISTRIBUIDORA DE LIBROS UNIVERSITARIOS  
Insurgentes Sur 299  
México 11, D. F. MEXICO

Conformément à la décision prise à Montréal par le Comité Directeur, un volume broché contenant les résumés de tous les travaux acceptés pour les Séances Principales a été envoyé par avion en deux exemplaires à toutes les Sociétés nationales, au début du mois de mai 1969.

#### 6. PARTICIPATION AU CONGRES

La Table II contient des références détaillées concernant les participants.

#### 7. COMITE DIRECTEUR

Le Comité Directeur de la Société Internationale s'est réuni les 22 et 23 août, à l'Auditorium N°3 du Centre des Congrès, sous la présidence de M. Laurits Bjerrum. Chaque pays membre était représenté par deux délégués. La liste des délégués et les actes des réunions figurent dans ce volume, pages 13 à 33. Le Comité d'organisation avait prévu un service de secrétariat et d'interprétation simultanée. Les minutes de chaque réunion furent distribuées aux délégués le jour suivant et la version finale, en français et en anglais, fut publiée avant la fin du Congrès.

#### 8. SEANCES PRINCIPALES

Les Rapporteurs Généraux ont été désignés le

tive Secretary of the Organizing Committee, traveled to exchange ideas with the General Reporters and several other prominent members of the International Society. Both paid a visit to the President of the International Society, to firm up plans for the Conference.

On Sunday, August 24, a briefing session was attended by all participants in the Main Sessions. Afterwards, on the same and following days, the Chairman, General Reporter, Panelists, and Secretary of each Session met to arrange the necessary final details. For each Session, the Chairman and General Reporter were given freedom to decide the layout of the Session.

There were five Main Sessions. Only one Session took place each day, from Monday to Friday. All Main Sessions were held in Auditorium N° 1 of the Unidad de Congressos. Each session started with a "State-of-the-Art" lecture by the General Reporter, followed by a panel discussion by specialists. Subsequently, there were in some cases questions posed by members of the audience and also discussions from the floor. Discussers were asked to register during the recess. All morning sessions started at 9:30 hours and adjourned between 12:30 and 13:00 hours. The audience always exceeded 1,000 persons.

## 9. SPECIALTY SESSIONS

Eighteen Specialty Sessions (thirteen proposed by the Advisory Committee and five requested by the interested groups) took place in the afternoons from Tuesday to Friday. Two days, six such sessions were carried out simultaneously and the other two days, there were five simultaneous sessions. Since one of the purposes of these sessions was to find by experiment, what type of sessions will be more desirable for future conferences, only broad guidelines were established, and each session organizer gave his a particular character. As a result, these sessions varied from informal discussions with very little advance preparation, to rather formal meetings, in the way of simposia, for which papers were solicited, panel discussions took place and proceedings were to be published. Some of the sessions met on two consecutive afternoons.

The facilities at the Unidad de Congressos turned out quite adequate for this type of meeting since there were seven lecture halls available within the Unidad de Congressos with capacities ranging from 85 to 350 persons. Members could easily go from one auditorium to another if they so desired.

The responsibility for these sessions was in

26 juillet 1967; les membres du Comité de Discussion, le 25 novembre 1968 et les Présidents de Séance, le 29 novembre 1968. Une abondante correspondance a été échangée avant le Congrès entre le Comité d'organisation et les participants. En outre, le Président, puis le Secrétaire Exécutif, ont effectué plusieurs voyages afin d'échanger des idées avec les Rapporteurs Généraux et plusieurs membres éminents de la Société Internationale. L'un et l'autre ont rendu visite au Président de la Société Internationale, afin de mettre au point ensemble la programme du Congrès.

Le dimanche 24 août, eut lieu une séance d'information à laquelle assistèrent tous les participants aux Séances Principales. Les jours suivants, le Président, le Rapporteur Général, les membres du Comité de Discussion et le Secrétaire se sont réunis afin de mettre au point les détails de leur Séance respective. L'organisation des Séances était laissée à l'initiative du Président et du Rapporteur Général.

Il y eut cinq Séances Principales, à raison d'une par jour, du lundi au vendredi. Toutes les Séances Principales ont eu lieu à l'Auditorium N° 1 du Centre des Congrès. Au début de chaque Séance, le Rapporteur Général procédait à la lecture d'un Résumé des Connaissances sur le thème, après quoi les spécialistes du Comité de Discussion entamaient les débats. Dans certains cas, des questions étaient posées par des membres de l'auditoire ou bien la parole était donnée aux orateurs. Pour avoir le droit de prendre la parole, il était nécessaire de s'inscrire entre les séances. Toutes les séances du matin commencèrent à 9h.30 et se terminèrent entre 12h.30 et 13h.00. Le nombre d'auditeurs dépassa tous jours le chiffre de 1,000.

## 9. SEANCE SPECIALES

Dix-huit Séances Spéciales, dont treize proposées par le Comité Consultatif et cinq organisées à la demande des groupes intéressés ont eu lieu l'après-midi, du mardi au vendredi. Les séances se sont déroulées simultanément à raison de six pendant deux jours, et de cinq pendant les jours suivants. Comme il s'agissait de réaliser une sorte d'expérience afin d'établir, en vue des futurs congrès, la formule qui convient le mieux pour des séances de ce genre, chaque organisateur fut entièrement libre d'organiser sa séance comme il l'entendait. C'est pourquoi ces réunions furent très différentes les unes des autres, certaines ayant un caractère d'improvisation tandis que d'autres furent de véritables symposiums, avec communications, comités de discussion, et publication de Comptes-Rendus.



the hands of the respective organizers to whom all requests for information should be addressed. They were only requested to submit a summary report, for publication in this volume (see pages 417 to 554 ). It is hoped that the varied outcome of these numerous meetings will help in deciding how should sessions be carried out in future conferences. The Organizing Committee also put at the disposal of several groups interested in holding discussions, some of the committee rooms available at the Unidad de Congresos.

#### 10. TECHNICAL FILMS

In the afternoons, from Tuesday August 26 to Friday 29, technical films were projected in Auditorium N° 1 of the Unidad de Congresos. The highlight of this activity was a film on the soil mechanics aspects of the lunar soil and the first landing of man on the moon. These latter films were illustrated with talks by Professors Scott and Mitchell. In addition 16 other films were projected, among them several showing various aspects of soil mechanics work in Mexico.

#### 11. TECHNICAL VISITS

One of the main attractives for Conference Members was the chance to obtain first-hand information on the clay of the Valley of Mexico with the well-deserved reputation for creating most unfavorable conditions to all kinds of construction projects.

At the time of the Conference, there were important construction operations in Mexico City and its vicinity, which posed interesting soil mechanics problems. Foremost among these were the construction of the subway lines and the deep sewage system. Also a visit was paid to the soil mechanics laboratory of the Institute of Engineering of the National University.

Technical visits took place in the afternoons, from Tuesday to Friday and also on Sunday morning, August 31. In addition, by special arrangement, some Conference Members continued to inspect construction sites and laboratories, on the week following the Conference.

A description of the Technical Visits is found in page 595 of this volume.

#### 12. EXHIBITS

In the lower floor of the Unidad de Congresos, an exhibition was arranged, with two kinds

Certaines eurent lieu pendant deux après-midi consécutifs.

Les installations du Centre des Congrès se prêtèrent parfaitement à ce type de réunion. Il y avait en effet cinq salles de conférence disponibles, d'une capacité de 85 à 350 personnes. Les Congressistes pouvaient se rendre facilement d'un auditorium à l'autre.

L'initiative de ces séances était laissée aux organisateurs, auxquels toute les demandes d'information devaient être adressées, ces derniers étant seulement priés de remettre un rapport sommaire destiné à paraître dans ce volume (Voir pages 417 à 554 ). Les résultats divers de ces nombreuses réunions devraient permettre de déterminer la meilleure formule à suivre lors des prochains congrès. Le Comité d'organisation avait également mis quelques unes de ses salles à la disposition des groupes qui désiraient tenir des séances de discussion.

#### 10. FILMS TECHNIQUES

Du mardi 26 au vendredi 29 août, pendant les après-midi, des films techniques ont été projetés à l'auditorium N° 1 du Centre des Congrès. Le plus remarquable de la série fut un film présentant, d'une part, les aspects du sol lunaire du point de vue de la Mécanique des Sols et d'autre part, les différentes phases de l'alunissage. Ces deux documentaires furent commentés par les Professeurs Scott et Mitchell. En outre, 16 autres films furent projetés dont plusieurs montrant différents problèmes et travaux de mécanique des sols à Mexico.

#### 11. VISITES TECHNIQUES

L'un des principaux intérêts du Congrès était de permettre aux congressistes d'examiner de près l'argile de la Vallée de Mexico justement renommée pour être l'une des plus défavorables en matière de fondations.

A l'époque de la Conférence, il y avait justement à Mexico même et dans ses environs, d'importants travaux de construction en cours qui posaient d'intéressants problèmes de mécanique des sols. Il y avait principalement la construction du métro et du grand réseau de drainage des eaux d'égout. Une visite eut lieu également à l'Institut de Génie Civil de l'Université Nationale. Les visites techniques se déroulèrent pendant l'après-midi, du mardi au vendredi, ainsi que dans la matinée du dimanche 31 août. En outre, et grâce à des arrangements spéciaux, certains congrès-

of exhibits:

- a. Government and research organizations in Mexico dealing with soil mechanics problems, presented aspects of their work
- b. Twenty-six manufacturers of soil mechanics equipment, exhibited their products, with emphasis on field instrumentation

The Mexican Society for Soil Mechanics operated a stand where several books on soil mechanics were on sale. There were also other book stands.

All exhibits were visited with interest by the majority of Conference participants.

### 13. OPENING AND CLOSING SESSIONS

The Opening Session, to which ladies accompanying Conference Members were invited, took place on Monday, August 25, in Auditorium N° 1 of the Unidad de Congresos (see page 95 of this volume). Mr. Enrique Tamez, Chairman of the Organizing Committee, welcomed all participants in the Conference. Then, the Conference was declared open by Mr. José Hernández Terán, Minister of Hydraulic Resources, on behalf of the President of Mexico. Afterwards, Dr. Laurits Bjerrum, President of the International Society, gave his Presidential Address. Finally, Prof. Arthur Casagrande presented to Mrs. Elena Carrillo, the widow of Dr. Nabor Carrillo and to Nabor Carrillo Jr., the first copies of the Carrillo Volume, published by Proyecto Texcoco on the occasion of the Conference.

The Closing Session was combined with a farewell dinner at the Castillo de Chapultepec, attended by nearly 2,000 persons. Dr. Laurits Bjerrum presented the new President of the International Society, Prof. Ralph B. Peck. The Conference was declared closed by Mr. Gilberto Valenzuela, Minister of Public Works. A description of this Session is found in pages 107 to 111 of the present volume.

### 14. SOCIAL ACTIVITIES

All Conference Members and persons accompanying them were invited to the following activities:

Welcome buffet after the Opening Session

Performance of the Ballet Folklórico de México, on the evening of Thursday, August 28

sistes purent continuer à visiter les chantiers et les laboratoires pendant la semaine que suivit la Conférence.

La description de ces visites techniques figure dans ce volume, page 595

### 12. EXPOSITIONS

Le sous-sol du Centre des Congrès fut transformé en Salon d'Exposition. Les expositions étaient de deux types:

- a. Les services officiels de recherche et de travaux publics présentèrent différentes réalisations en rapport avec la mécanique des sols
- b. Vingt-six fabricants d'équipement de mécanique des sols exposèrent leur matériel, principalement des instruments de mesure in situ.

La Société Mexicaine de Mécanique des Sols avait installé un stand pour la vente d'ouvrages traitant de cette discipline. Il y avait également d'autres stands de livres.

Toutes les expositions ont suscité un grand intérêt parmi les congressistes.

### 13. OUVERTURE ET CLOTURE DES SEANCES

La Séance d'Ouverture, à laquelle les dames ont été invitées à assister, a eu lieu le lundi 25 août, à l'auditorium N° 1 du Centre des Congrès (voir page N° 95 de ce volume). M. Enrique Tamez, Président du Comité d'organisation a souhaité la bienvenue aux participants après quoi, au nom du Président du Mexique, M. José Hernández Terán, Ministre des Ressources Hydrauliques, a déclaré l'Ouverture du Congrès. Ensuite, M. Laurits Bjerrum, Président de la Société Internationale, a prononcé son allocution. Enfin, le Prof. Arthur Casagrande a présenté à Mme. Elena Carrillo, Veuve de M. Nabor Carrillo et à Nabor Carrillo Jr., les premiers exemplaires du volume Carrillo, publié par le projet de Texcoco, à l'occasion du Congrès.

Au cours de la Séance de Clôture, M. Laurits Bjerrum a présenté le nouveau Président de la Société Internationale, M. Ralph B. Peck. La clôture des travaux a été prononcée par M. Gilberto Valenzuela, Ministre des Travaux Publics. Pour la description de cette séance, voir page 107 à 111 de ce volume.

Enfin, un dîner d'adieu auquel ont participé deux mille personnes, a été donné au Château de Chapultepec.

Farewell dinner at the Castillo de Chapultepec on Friday 29

Visit to the Archaeological zone of San Juan Teotihuacán on Saturday 30.

In addition, a Ladies' program was carried out (see page 40 of this volume) which was attended by nearly all ladies accompanying Conference Members. The success of this program was possible thanks to the gracious cooperation of a large number of Mexican ladies.

#### 15. TOURS OUTSIDE MEXICO CITY

These tours were planned as recreational and cultural, since important construction projects outside Mexico City were not at that time in a stage interesting from the standpoint of soil mechanics.

In spite of the unfavorable weather conditions that unfortunately prevailed almost throughout Mexico during the Conference and the following week, all tours were carried out successfully, with the exception of Tour A in which major problems arose. A report on these tours is found in pages 601 to 608 of this volume.

#### 16. FINANCES

In addition to registration fees and the sale of sets of the Proceedings, the Conference was financed by a grant from the Mexican Federal Government, through the Ministry of Hydraulic Resources and by donations received from contracting, engineering, industrial, and consulting firms in Mexico. Several Government Agencies helped generously by providing personnel, equipment, and other services.

The complete list of patrons and donors is presented in page 3&11 of this volume, where the Organizing Committee records its thanks. The generosity of donors made possible to provide free transportation service from the hotels to the Unidad de Congresos, to cover the deficit created by cancellation charges for Tour A and to provide services to the Executive Committee.

#### 17. SECRETARIAT

From the appointment of the Organizing Committee in October, 1965, onwards, Mr. Luis Ramírez de Arellano served as Executive Secretary. This was possible through the cooperation of the Comisión Federal de Electricidad and the Instituto de Ingeniería (UNAM).

#### 14. ACTIVITES SOCIALES

Tous les congressistes et les personnes de leur entourage ont été invités aux manifestations suivantes:

Buffet d'accueil après la Séance d'ouverture

Le jeudi 28 août, en soirée, représentation du Ballet Folklorique de Mexico

Le vendredi 29 août, Dîner d'adieu au Château de Chapultepec

Le samedi 30, visite de la zone archéologique de San Juan Teotihuacán.

En outre la plupart des dames accompagnant les congressistes ont participé au programme prévu à leur intention. (Voir page 40 de ce volume). Le succès de ce programme est à mettre au compte des nombreuses dames mexicaines qui y ont apporté tout leur concours.

#### 15. EXCURSIONS HORS DE LA VILLE DE MEXICO

Il s'agissait d'excursions organisées dans un but récréatif et culturel. En effet, en ce qui concerne la plupart des grands projets de construction situés hors de la ville, l'avancement des travaux ne présentait pas d'intérêt particulier du point de vue de la mécanique des sols. En dépit du mauvais temps qui a régné pendant presque toute la durée du Congrès, toutes les excursions se sont déroulées avec succès, à l'exception toutefois du voyage A qui a été annulé à cause de la pluie. Le compte-rendu de ces excursions figure dans les pages 601 à 608 de ce volume.

#### 16. FINANCEMENT

Mis à part les revenus tirés des droits d'inscription et de la vente des Comptes-Rendus, le Congrès a été financé par une subvention du Gouvernement Mexicain, par l'intermédiaire du Ministère des Ressources Hydrauliques et par différentes firmes mexicaines: entreprises compagnies industrielles, bureaux d'études etc. Plusieurs agences gouvernementales ont prêté généreusement leur concours en fournissant du personnel, du matériel ou d'autres services.

La liste complète des bienfaiteurs et des donateurs figure à la page 3&11 de ce volume, consacrée aux remerciements. La générosité de ces groupes a permis de mettre à la disposition des congressistes un service de transport gratuit de leurs hôtels jusqu'à la Unidad de Congresos, de couvrir le déficit causé par l'annulation du voyage A et de fournir

From November, 1967, onwards, he was helped full time by Miss Alma Aguirre D., who collaborated with the Organizing Committee until the closure of its operations. Her dedication and enthusiasm were a tremendous help to the Committee. Other members of the staff deserve to be highly commended.

On March, 1968, office space was rented to facilitate the work of the Committee and its personnel grew to a maximum of thirty-seven persons prior to the Conference. During the week of the Conference sixty persons were engaged. Six interpreters served from sometime before the Conference and attended several briefing sessions in advance of their main task at the Main Sessions.

#### 18. ACKNOWLEDGEMENT

The Organizing Committee wishes to record its appreciation of the help and advice received from the following persons: Messrs. Fernando Hiriart, Gerardo Cruickshank, Salvador Aguilar Chávez and Alberto Barocio, and Dr. Roger Díaz de Cossío.

des services au Comité Directeur.

#### 17. SECRETARIAT

M. Luis Ramírez de Arellano a occupé le poste de Secrétaire Exécutif du Comité d'organisation dès la nomination de ce dernier. Il est juste de mentionner ici la précieuse collaboration apportée par la Commission Fédérale d'Electricité d'une part et, d'autre part, par l'Institut de Génie Civil de l'UNAM.

A partir de novembre 1967, M. Ramírez de Arellano a été aidé dans ses fonctions par Mlle. Alma Aguirre D., qui a travaillé à plein temps avec le Comité d'organisation jusqu'à la fin de ses travaux. Son dévouement et son efficacité ont constitué une aide extrêmement précieuse pour le Comité. D'autres membres du personnel sont dignes également de tous les éloges.

En mars 1968 le Comité a loué des bureaux pour faciliter la tâche de son personnel dont les effectifs comprenaient, avant la Conférence, trente-sept personnes, pendant le Congrès, soixante personnes ont été engagées. Les six interprètes recrutés quelque temps avant la Conférence ont assisté à des réunions d'information afin de se préparer pour les Séances Principales.

#### 18. REMERCIEMENTS

Le Comité d'organisation désire exprimer ici sa reconnaissance et ses remerciements aux personnes suivantes pour les précieux services qu'elles lui ont rendus: MM. Fernando Hiriart, Gerardo Cruickshank, Salvador Aguilar Chávez et Alberto Barocio, et Roger Díaz de Cossío.

TABLE I

Country/Pays	Original allocation/ Nombre alloué	Papers published/ Mémoires publiés	Number of discussions/ Nombre de dissertations
Argentina/Argentine	2	-	2
Australia/Australie	6	6	-
Austria/Autriche	2	1	-
Belgium/Bélgique	3	2	1
Brasil/Brésil	4	3	3
Bulgaria/Bulgarie	2	2	-
Canada	6	7	4
China/Chine	2	-	-
Colombia/Colombie	1	1	-
Czechoslovakia/Tchécoslovaquie	3	3	-
Denmark/Danemark	2	2	-
Ecuador/Equateur	1	-	-
Egypt/Egypte		1	-
Finland/Finlande	1	1	-
France	10	9	4
Germany/Allemagne	5	5	2
Ghana		1	-
Great Britain/Grande-Bretagne	11	11	1
Greece/Grèce	1	-	-
Hong Kong		1	1
Hungary/Hongrie	3	2	-
India/Inde	5	5	1
Iran		1	-
Ireland/Irlande	2	2	1
Israel/Israël	4	4	-
Italy/Italie	3	3	2
Japan/Japon	6	6	2
Malaysia/Malaisie		1	-
Mexico/Mexique	4	4	3
Morocco/Maroc	1	1	-
Netherlands/Pays-Bas	4	3	-
New Zealand/Nouvelle-Zélande	1	1	-
Norway/Norvège	4	4	4
Peru/Pérou	1	-	-
Poland/Pologne	3	2	-
Portugal	4	4	-
Republic of South Africa/République de l'Afrique du Sud	4	4	-
Rhodesia/Rhodésie	1	-	-
Rumania/Roumanie	2	2	-
Spain/Espagne	3	3	2
Sweden/Suède	3	2	-
Switzerland/Suisse	4	4	-
Thailand/Thaïlande		1	-
Turkey/Turquie	2	2	-
U. S. S. R./U. R. S. S.	13	9	4
U. S. A./E. U. A.	17	17	2
Venezuela/Vénézuéla	1	-	-
Yugoslavia/Yougoslavie	3	3	-
Total	160	146	39

TABLE II

Country/Pays	Attending/ Présent	Ladies/ Déléguées	Total
Algeria/Algérie	4	3	7
Angola	2	-	2
Argentina/Argentine	22	11	33
Australia/Australie	15	5	20
Austria/Autriche	6	-	6
Belgium/Belgique	14	7	21
Brasil/Brésil	17	8	25
Bulgaria/Bulgarie	1	-	1
Canada	105	56	161
Ceylon/Ceylan	1	-	1
Chile/Chili	11	4	15
Colombia/Colombie	11	4	15
Costa Rica	3	-	3
Czechoslovakia/Tchécoslovaquie	1	-	1
Denmark/Danemark	7	3	10
Ecuador/Equateur	7	5	12
El Salvador	2	1	3
Finland/Finlande	4	2	6
France	52	21	73
Germany/Allemagne	37	12	49
Ghana	4	-	4
Great Britain/Grande Bretagne	58	19	77
Greece/Grèce	3	3	6
Guatemala/Guatemala	1	-	1
Honduras	1	1	2
Hong Kong/Hong-Kong	4	2	6
Hungary/Hongrie	1	-	1
India/Inde	6	1	7
Iran	3	1	4
Ireland/Irlande	4	-	4
Israel/Israël	12	5	17
Italy/Italie	27	16	43
Japan/Japon	34	2	36
Malaysia/Malaisie	1	-	1
Mexico/Mexique	407	96	503
Morocco/Maroc	6	-	6
Netherlands/Pays-Bas	14	3	17
New Zealand/Nouvelle-Zélande	4	4	8
Norway/Norvège	15	5	20
Panama	1	-	1
Peru/Pérou	10	2	12
Philippines	2	-	2
Portugal	4	2	6
Republic of South Africa/République de l'Afrique du Sud	15	8	23
Rumania/Roumanie	2	1	3
Spain/Espagne	15	11	26
Sweden/Suède	22	11	33
Switzerland/Suisse	21	8	29
Thailand/Thaïlande	4	2	6
Turkey/Turquie	3	-	3
U.S.S.R./U.R.S.S.	6	-	6
U.S.A./E.U.A.	322	178	500
Venezuela/Vénézuéla	39	10	49
Yugoslavia/Yougoslavie	4	-	4
<b>T o t a l</b>	<b>1397</b>	<b>533</b>	<b>1930</b>

## REPORT FROM THE TECHNICAL VISITS SUB-COMMITTEE

### RAPPORT DU SOUS-COMITE DES VISITES TECHNIQUES

The technical visits included four different aspects of Soil Mechanics in Mexico City:

1. Underground Railway (Metro).
2. Clay Tunnels of the Valley of Mexico.
3. Trip around the city to observe the sinking of the Valley of Mexico.
4. Soil Mechanics Section of the Institute of Engineering.

These visits took place daily during the Conference for people who were interested in more than one, or wanted to attend the most interesting ones for them.

The number of attendants to the Technical Visits was 1414 persons.

#### DESCRIPTION OF VISITS

1. Underground Railway of Mexico City (Metro).

The Hidalgo and Morelos stations were visited, where they had the opportunity of observing the construction of cast in - situ walls, as a part of the construction methods used in the job which employed two different methods:

The first method, most used, starts with the excavation of small shallow trenches either side of the future retaining wall. These trenches are faced with slightly reinforced concrete of a reduced thickness to serve as rims for the next stage, in which the excavation is prolonged to its total depth, stabilizing it by means of bentonitic muds (clay).

After placing the built - up frame inside the bentonitic mud the pouring of concrete is begun by means of a tremie. The retaining wall of the caisson of the subway is poured in limited panels using joints of special

Quatre visites techniques ont permis aux congressistes d'apprécier divers aspects des problèmes de mécanique des sols à Mexico:

1. Visite du Métro
2. Visite de tunnels creusés dans l'argile de la Vallée de Mexico
3. Visite de la ville pour observer les effets de l'affaissement de la Vallée de Mexico
4. Visite de la section de Mécanique des sols de l'Institut du Génie Civil.

Pendant le Congrès, ces visites ont été organisées tous les jours afin d'offrir aux congressistes la possibilité de participer à plusieurs d'entre elles. Le nombre total des participants s'est élevé à 1414.

#### COMPTE RENDU DES VISITES

1. Le Métro.

Les congressistes ont pu visiter les stations Hidalgo et Morelos et observer une des deux méthodes de construction utilisées pour cet ouvrage: celle des parois moulées.

Cette méthode, la plus utilisée, consiste à excaver des tranchées étroites et peu profondes des deux côtés du futur caisson, à les revêtir de béton peu armé et de faible épaisseur a fin de faciliter l'étape suivante au cours de laquelle les tranchées sont creusées jusqu'à leur profondeur définitive, les parois étant stabilisées au moyen de boue de bentonite.

Après la mise en place des armatures dans la tranchée, on coule le béton sous la boue de bentonite on obtient ainsi des pans de murs latéraux limités par les joints de construction. On procède ensuite à l'excavation du noyau par des méthodes conventionnelles, les parois étant maintenues par des étrépillons.

construction. When the pouring of the retaining wall has been finished, the excavation of the nucleus, by conventional methods, is begun, shoring it by means of conveniently spaced braces. When the excavation has been finished the floor slab of the caisson and the covering slab are poured, the caisson is roofed over and the fill is placed and municipal services, crowning it with new paving.

The second method is used in exceptional cases, such as those of crossings with important avenues and which require a minimum time, it consists in initially pouring the walls as in the first method and after having poured the slab of the covering of the caisson, which is filled and finished in the way described in the preceding method, the excavation is made by means of tunneling.

350 persons attended this visit, transportation was given by ten buses; visitors received detailed information about all questions which came up from the guide's explanation, besides, they were given explicative technical booklets.

## 2. Tunnels through the clay of the Valley of Mexico.

In order to include the technical advance of the country on tunnels through clay four shafts were especially selected for the easy exposition of the advances and construction methods they show:

- a) Shaft O of the Central Emitter.
- b) Shaft No. 10 of the Eastern Interceptor.
- c) Shaft No. 11 of the Central Interceptor.
- d) Shaft No. 7 of the Central Emitter.

a) Shaft O of the Central Emitter is located at its junction with the deep Interceptor, near Tenayuca, Northwest of the City.

Visitors descended through a shaft which has a diameter of 10 meters and walked through the tunnel, approximately 8 meters in diameter bored through compact materials.

In this zone of the Valley, sandy silts and cemented sandy silts exist, for which reason the use of tunneling shields has not been required, on this front of work the method of nozzled concrete has been used to constitute the primary facing of the tunnel. Visitors had the opportunity to observe this work.

b) Shaft No. 10 of the Eastern Interceptor is located on the Southern margin of the Los Remedios River, to the north of the City, constructed on clay material. Visitors had the chance to see the equipment of excavation (shield) on the surface which soon was to be

On coule ensuite le radier, les parements des murs du caisson et la dalle supérieure que l'on recouvre d'un remblai destiné aux services municipaux, et d'un nouveau revêtement.

La seconde méthodes n'est utilisée que dans des cas exceptionnels, notamment lorsque les travaux ont lieu au croisement de deux avenues importantes, nécessitant ainsi leur prompte réalisation pour une reprise rapide du trafic. Elle consiste à couler les murs comme dans la méthode précédent, puis la dalle supérieure du caisson recouverte également d'un remblai et d'un revêtement. L'excavation du noyau se fait ensuite par un tunnel.

350 congressistes ont fait cette visite pour laquelle dix autobus ont été nécessaires. Des bulletins d'informations ont été distribués et des guides se sont efforcés de répondre dans le détail aux questions posées.

## 2. Tunnels creusés dans l'argile de la Vallée de Mexico.

Afin de faire connaître aux congressistes les techniques mexicaines de creusement de tunnel dans l'argile, quatre visites ont été organisées à des puits d'accès se prêtant particulièrement à l'appréciation de l'avancement des travaux et des systèmes de construction:

- a) au puits d'accès 0 de l'Emetteur Central
- b) au puits d'accès 10 de l'Intercepteur Est
- c) au puits d'accès 11 de l'Intercepteur Central
- d) au puits d'accès 7 de l'Emetteur Central.

a) Le puits d'accès 0 de l'Emetteur Central se trouve près de Tenayuca, au Nord-Ouest de Mexico, au croisement de deux intercepteurs profonds.

Les congressistes sont descendus par un puits d'accès de dix mètres de diamètre et on fait un court parcours dans le tunnel de huit mètres de diamètre situé dans des terrains compacts. Etant donné que dans cette zone se rencontrent des limons sableux et des sables limoneux grésifiés, il n'a pas été nécessaire d'utiliser les boucliers d'excavation pour le creusement du tunnel. Le revêtement primaire de celui-ci est réalisé en béton jeté dont la mise en place a pu être observée durant la visite

b) Dans le puits d'accès 10 de l'intercepteur Est, situé au bord de la rivière



lowered into the interior of the subsoil to begin the deep tunnel.

c) Shaft No. 11 of the Central Interceptor is located on the Avenue of the 100 Meters, to the North of the City, constructed in semicompact materials requiring the use of drilling shield.

Visitors descended to a depth of 37 meters and the drilling shield could be seen working. It is a closed front shield, with a core wall which has a balancing cutter that goes forwards or backwards independently of the forward movement of the shield. To stabilize the front of the tunnel, the space between the bulkhead and the said front is full of mud, or water, under pressure.

The primary shoring of the tunnel consists of rings formed by pre-cast concrete vousseirs and screwed together, another ring of concrete poured on site, constitutes the definite coating. The excavated material is eliminated by mixing it with water at high turbulence, to form a suspension that can be pumped, and is sent to the outside.

d) Shaft No. 7 of the Central Emitter is located downtown. Constructed by the "flotation" method in the clay of the Valley of Mexico, by a shield of 4.00 meters in diameter at a depth of 15 meters with a honeycombed front and, protected by a security bulkhead; the disposal of the material left behind has been made by liquification and sending it to the outside by means of tubing.

293 people attended to the visit, transportation was given by 11 buses, they received a detailed information of the methods used, besides explicative technical booklets.

3. Trip around the City to observe the subsiding of the Valley of Mexico. The visit included that part of the City which has its foundations on the fill over the ancient lake and some characteristic buildings, such as:

a) The School of the Vizcainas and the construction situated on San Jeronimo St. at the corner with Correo Mayor, which has two levels and has suffered through the passing of time important differential settlements due to local consolidations of the original soil.

b) Palace of Fine Arts and Palace of Mining where one can see great total and differential settlements, due to the consolidation of the clay of the Valley of Mexico. The Palace of Fine Arts, (1904-1943) with an area of approximately 9,700 sq. mt., weighs 116,000 tons and imposes on the soil an overload of 12 tons/sq. mt. There existed, previously, a convent with

"Los Remedios" au nord de Mexico, et creusé dans un terrain argileux, le bouclier d'excavation - qui devait plus tard être descendu pour le commencement des travaux du tunnel a été observé en surface

c) Pour les puits d'accès 11 de l'Intercepteur Central, également au nord de Mexico, sur l'avenue de Los Cien Metros, et situé dans des terrains semi-compacts, il a été nécessaire d'utiliser un bouclier d'excavation. Les congressistes sont descendus à 37 mètres de profondeur et ont pu observer ce bouclier au travail, lequel est fermé à l'avant par une cloison étanche, dotée d'un système de coupe basculant qui avance ou recule indépendamment de la progression du bouclier. Pour stabiliser le front du tunnel, on remplit l'espace entre ce dernier et la cloison étanche de boue ou d'eau sous pression. Le revêtement primaire du tunnel est formé par des anneaux de voussoirs en béton préfabriqué vissés entre eux; le revêtement définitif est constitué par un autre anneau de béton coulé sur place. Les déblais sont mélangés avec de l'eau à haute turbulence afin de former une boue qui puisse être pompée vers l'extérieur

d) Le puits d'accès 7 de l'Emetteur Central, au centre de la ville, a été construit par la méthode de "flottaison" dans l'argile de la vallée de Mexico, à 15 mètres de profondeur, à l'aide d'un bouclier de quatre mètres de diamètre dont l'avant est équipé d'une grille coupante et d'une cloison de Sécurité. Les déblais sont liquéfiés et pompés vers l'extérieur. Les congressistes ont pu parcourir le tronçon terminé; 293 d'entre eux ont fait cette visite pour laquelle 11 autobus ont été nécessaires; ils ont reçu des bulletins techniques explicatif et des informations détaillées sur la méthode utilisée.

3. Visite de la ville pour observer les effets de l'affaissement de la Vallée de Mexico. Un parcours a été effectué à Mexico dans la partie édifiée sur le fond de l'ancien lac, et les constructions caractéristiques suivantes ont été visitées:

a) Le Collège des "Vizcainas" et le bâtiment de la rue "San Jerónimo" faisant le coin avec la poste centrale, bâtiments de deux étages qui avec le temps ont subi des tassements différentiels importants dus à la préconsolidation locale du terrain

a church which had its foundations on piles. Nevertheless, the builders decided to use a massive concrete slab, whose thickness varies from 1.8 to 3.0 meters and whose weight is 46,000 tons. There was a settlement at the center of 4 cm. in 1907. The settling had a velocity of 4 cm. per month, which afterwards increased to 4.3 cm. per month. Then, it was isolated by sheet piling, and grout and sand were injected, (70,000 sacks of cement) reducing the settling to 1.1 cm. per month. To date the total sinking is close to 3.5 meters. Due to the general settlement of the Valley, and that the soil under its foundation is strongly consolidated, its relative movement is in ascendance with respect to the floor of the Central Park (Alameda).

c) Guardiola Building, Monument to the Revolution and Monument to Independence, in which the foundations are on basis of piles that pierce the compressible clays and rest on compact layers, which, originated the emergence of these buildings up to 4.00 meters.

Monument to the Revolution (1906-1936). Originally, the Legislative Palace was to have been constructed on this site, the construction of the foundation for the complex of buildings was begun, of which the central one had foundations on wood piles driven to the compact layer, and the wings were placed on mat foundations, but important differential movements developed that even came to the point of making the joining, between the beams and the columns of the wings and the building on piles, difficult; it was decided to dismantle the wings and take advantage of domed central part for the construction of the Monument. Some shoring pipes can be seen in its proximity that show in an objective manner the settlement of the Valley of Mexico which is about 7 meters.

Monument to Independence (1910), the original foundation by mat failed during the construction. The foundation slab has a thickness of 1 meter and is 18 meters in length. The new foundation has 465 wood piles with a length of 23 meters that only reach the first structures of the clay formation on this site, and a metallic sheet pile was thrust in the periphery of the foundation; supporting the 8550 ton that the monument weighs the surrounding land has sunk 6.0 meters up to date, the foundation has jutted out 1.80 meters.

Latinamerican Tower, whose total weight is 24,000 tons, occupies a total area of 1,300 square meters and is built on highly compressible clay, for which reason it was necessary to design a foundation compensated with piles resting on a layer of semi-compact sand, which is at a depth of 33 meters. 361

b) Le "Palacio de Bellas Artes" et de "Minerfa" où l'on observe de grands tassements absolus et différentiels, résultant de la consolidation de l'argile de la Vallée de Mexico. Le "Palacio de las Bellas Artes" (1904-1943) dont la superficie est d'environ 9 700 m<sup>2</sup>, pèse 116,000 tonnes ce qui impose au terrain une surcharge de 12 tonnes/m<sup>2</sup>. Bien que la construction précédente, un couvent, ait été fondée sur pieux, on décida d'utiliser un radier en béton dont l'épaisseur variait entre 1 m. 80 et 3 m. et posant 46 000 tonnes et qui produisit un enfoncement de 4 cm durant les premières étapes de construction. En 1907 le tassement était de 4 cm. par mois, puis lorsqu'il atteint 4,3 cm par mois, on décida d'entourer la construction d'un rideau de palplanches et on injecta du mortier et du sable (70,000 sacs de ciment) réduisant ainsi le tassement à 1,1 cm par mois. Actuellement celui-ci est au total de près de 3,50 m et en raison du tassement général de la Vallée et du fait que son terrain de fondation est fortement consolidé, son mouvement est ascendant par rapport au niveau du parc voisin l'"Alameda Central"

c) L'Edifice "Guardiola", les Monuments à la Révolution et à l'Indépendance. Ces constructions, étant donné l'affaissement général de la Vallée et se trouvant fondées sur des pieux traversant des argiles compressibles reposant sur des couches compactes, émergent par endroit de quatre mètres. A l'emplacement du monument à la Révolution (1906-1936), on pensait construire le Palais Législatif en fondant la partie centrale sur pieux et les édifices périphériques superficiellement. Mais des problèmes de mouvements différentiels entre la partie sur pieux et les édifices du pourtour conduisirent à la démolition de ces derniers. La partie centrale fut utilisée pour la construction du monument. Certains tubes de sondage qui émergent de plus de 7 m permettent d'observer directement les tassements de la Vallée de Mexico.

Le monument à l'Indépendance (1910) avait à l'origine une fondation superficielle (dalle de fondation de 18 m de diamètre et d'un mètre d'épaisseur) qui se rompit pendant la construction; on refit les fondations avec 465 pieux de bois de 23 m de long qui n'atteignent que les premières couches résis-

piles were used and each has a diameter of 35 cm. "Button point" type piles were used, poured in site. The excavation needed for two basements and the structure of the foundation was carried to a depth of 13.50 meters making it necessary to drive Wakefield type sheet piling to a depth of 16 meters in the perimeter of the lot. As the excavations progressed shores were placed from one side to the other, to receive the exterior thrust against the sheet piling.

The hydraulic system designed to keep back the water consisted of four pumping wells with a depth of 35 meters and 8 absorption wells (outside the sheet piling), joined by a perimetral drain to conserve the external hydraulic pressures. The total weight of the whole construction is supported by the piles. Nevertheless, since the caisson of the foundation is totally hermetic, a pressure of water equal to 10 ton/sq. mt. acts on the foundation slab, which is controlled by means of 7 valves. It corresponds to approximately 40% of the weight of the building, with a total height of 181 meters distributed in 43 floors. The seismic coefficient considered was 5% in the base and to increase the rigidity in the structure and decrease deformations during earthquakes, the resisting strength of the slabs of concrete and the beams of the structure were combined.

Shrine of Our Lady of Guadalupe located in La Villa, the foundations were made by footings on the edge of the ancient lake, which gave as a result different thickness of compressible material under the foundation and, therefore, differential settlements, which have reached as much as 2.40 meters between one point and other of the building. There is a fault under the Shrine that crosses it transversally about 40 meters to the South of the extreme North of the building. This fault practically cuts the church, one part leaning towards the North and the other toward the South, opening a crack from the top down. The thickness of the clay in the North, is from about 5.00 meters to 14.00 meters, and in the South, it is about 50 meters, which causes very important deformations of the church structure. The longitudinal fault causes the shrine to slump considerably towards the East, thus separating itself from the Basilica in its upper part.

608 people attended this visit, certainly one of the most interesting, 16 buses were used to move them, they received all the informative technical help they needed

#### 4. Soil Mechanics Section of the Institute of Engineering.

The fourth and last visit corresponded to

tantes de la formation argileuse. Un rideau de palplanches métallique a été mis en place autour des fondations le terrain qui entoure le monument de 8,550 tonnes s'est affaissé à cette date de 6 cm., la fondation étant ressortie de 1 m. 80 par rapport à la surface.

d) La Tour Latino-Américaine. Celle-ci dont le poids total est de 24,000 tonnes et la surface 1 300 m<sup>2</sup>, se trouve sur une argile hautement compressible. La solution adoptée est une fondation compensée avec 361 pieux de 35 cm de diamètre du type "Pointe de bouton", coulés sur place, reposant sur une couche de sable semi-compact située à 33 m de profondeur et une excavation de 13,50 m de profondeur (deux sous-sols) entourée d'un batardeau de bois du type Wakefield de 16 m de long sur tout le périmètre maintenu par des étrépillons transversaux qui reçoivent les poussées extérieures sur le batardeau. Le système hydraulique destine à rabattre la nappe comprend 4 puits de pompage construits jusqu'à 35 m de profondeur et 8 puits d'absorption (hors du batardeau) reliés par un drain périphérique qui conserve les pressions hydrauliques extérieures. Le poids total de l'ensemble du bâtiment est supporté par les pieux, cependant, comme le caisson de fondation est totalement hermétique, il s'exerce sur la dalle de fondation une pression d'eau égale à 10 tonnes/m<sup>2</sup>, contrôlée par 7 valves, qui représente 40% de poids de l'édifice dont la hauteur totale est de 181 m répartis en 43 étages. On a pris en compte un coefficient sismique de 5% à la base, et pour augmenter la rigidité de la structure, et réduire les déformations lors des tremblements de terre, on a placé des armatures d'effort tranchant entre les dalles et les poutres de la structure.

e) La Basilique de la "Villa de Guadalupe".

Celle-ci est fondée en surface sur les contreforts de l'ancien lac, ce qui entraîne des différences d'épaisseur du matériel compressible et par suite des affaissements différentiels de l'ordre de 2 m 40 entre un point et un autre du terrain. Sous le Sanctuaire, se trouve un dôme rocheux qui le croise transversalement, à environ 40 m au sud de l'extrémité nord de l'édifice, et partage pratiquement l'église en deux; une partie s'incli-

laboratories of the Soil Mechanics Section of the Institute of Engineering:

Soil Mechanics Laboratory  
Rockfills Laboratory.

An explanation was given about the type of investigation that is being carried out in them illustrating it with booklets for the visitors. 163 people attended this visit.

ne donc vers le nord et l'autre vers le sud; une fissure s'est ouverte de haut en bas.

Au nord l'épaisseur d'argile varie entre 5 m. et 14 m, et au sud elle est de 50 m ce qui produit d'importantes déformations de l'église. Le dôme rocheux longitudinal provoque un affaissement considérable du "Sagrario" vers l'est, le séparant de la basilique en sa partie supérieure.

608 congressistes ont fait cette visite - certainement une des plus intéressantes - ; 16 autobus ont été mis à leur disposition ainsi que toutes les informations techniques qui leur étaient nécessaires.

#### 4. Visite de la Section de Mécanique des Sols de l'Institut de Génie Civil.

La quatrième et dernière visite a été celle des laboratoires de la section de Mécanique des sols de l'Institut de Génie Civil:

- Laboratoire de Mécanique des Sols
- Laboratoire des Enrochements.

Des explications ont été données sur la genre de recherches effectuées; des bulletins d'informations ont été par ailleurs distribués.

163 personnes ont fait cette visite pour laquelle 7 autobus ont été nécessaires.

REPORT FROM THE TOURS OUTSIDE MEXICO CITY SUB-COMMITTEE

RAPPORT DU SOUS-COMITE DES VOYAGES HORS DE MEXICO

After the Congress was over, several tours outside Mexico City were organized to both cultural and resort areas.

Tour A-1.- To the City of Merida, including visits to the archeological zones of Uxmal and Chichen-Itzá.

Tour A-2.- As an extension of Tour A-1 to the Island of Cozumel.

Tour B.- To the City of Oaxaca and visiting the archeological zones of Monte Alban and Mitla.

Tour C.- To the City of Villahermosa, visiting the archeological zone of Palenque.

Tour D-1.- To the Cities of Guanajuato and Guadalajara.

Tour D-2.- To Puerto Vallarta, as an extension of Tour D-1.

The routes were planned in order to include the most important archeological zones and some of the many monuments of the colonial epoch, which exist all over the country. Worldwide known resort places as Puerto Vallarta and Cozumel were also included.

Tour A-1.- To Mérida, and A-2, extension to Cozumel.

According to the original schedule, the group would leave Mexico City on August 31st, on the ordinary 6 p.m. commercial flight, and while tour A-1 would end by September 3d, the extension to Cozumel would then start, to end two days later on September 5th. Unfortunately adverse atmospheric conditions forced a 6 hour delay in the departure and, furthermore, the plane was sent to Cozumel, where it stayed for six more hours waiting for the wather condition in

Les excursions hors de Mexico furent les suivantes:

Excursion A-1, Mexico-Mérida-Chichen Itzá Uxmal.

Excursion A-2; même itinéraire terminé par la visite de Cozumel.

Excursion B, Mexico-Oaxaca-Monte Alban-Mitla.

Excursion C, México-Villahermosa-Palenque.

Excursion D-1, Mexico-Tepetzotlan-Guanajuato-Guadalajara.

Excursion D-2, même itinéraire terminé par la visite de Puerto Vallarta.

Ces exeursions ont permis aux voyageurs de voir les principales zones archéologiques et certains monuments coloniaux du Mexique.

Excursions A-1 et A-2.

Cette excursion dont le départ en avion était prévu pour le 31 Août à 8 heures devait durer jusqu' au 3 septembre et se prolonger jusqu'au 5 pour les personnes allant à Cozumel.

Mais pour différentes raisons et notamment état données les conditions atmosphériques, le départ de l'avion fut retardé.

De plus, l'avion ne put atterrir à l'aéroport de Mérida à cause de la brume et il dut aller jusqu'à Cozumel où les passagers attendirent plusieurs heures que les conditions atmosphériques s'améliorent à Mérida. En vain, puisque le lendemain matin à 7 heures ils durent rentrer directement à Mexico.

On fit les démarches nécessaires pour que l'excursion puisse aucir lieu et le nouveau départ fut fixé au 1er Septembre à 18 heures par vol spécial; mais la majorité des congressistes inscrites à ce voyage décidèrent de l'annuler. Le groupe, réduit à sept personnes,

Mérida to improve. Finally, after such an exhausting and tedious experience, the group had to go back to Mexico City at 7 a.m. of the following day. A special flight was chartered so that the group could leave to Merida at 6 p.m. September 1st. However, most of the visitors originally registered had decided to cancel their registration by then.

This time the plane - with the group reduced to seven people - took off and arrived on time, without any problem. The visitors spent their first night in Mérida.

Tuesday morning, September 2nd, the group was taken to Uxmal, name that refers the fact that the city was rebuilt three times. This is one of the most important cities where the Mayan culture flourished, with large buildings artistically decorated and symmetrically distributed.

The group visited the Wizard's Pyramid, constructed on several stages, the one at the bottom being outstanding with its facade beautifully decorated with masks of the God of the Rain. The Nunes' Quadrangle, a huge square bordered by buildings resting on platforms at different levels, with facades rich in decoration.

The most noticeable construction in the city is, no doubt, the Governor's Palace, though great in dimensions, amazingly proportionate and with fine decoration in the highest classical Mayan style. The temple of the Turtles is also outstanding; it is named that way because of the motif that decorates the cornice, of elegant simplicity.

The group stayed overnight in the Hotel Hacienda Uxmal, and departed in automobiles for Chichen-Itzá the following day.

Chichen-Itzá was founded in the VI Century and its Mayan name means Mouth of the Itzaes.

North of the main square, there stands the pyramid called The Castle, with the Jaguar's Temple at its top, and from which the whole city can be seen. Enormous serpents' heads carved on stone, are at the base and the sculpture of the red jaguar is in the interior.

The visitors' interest was captivated by the Ball's Game complex, the Court, the Sacred Tribune and Temple of the jaguar.

The visit to Chichen-Itzá ended with a visit to the Cenote Sagrado or well of the Sacrifices, a natural depression in the limestone that forms the peninsula, fed by filtra-

quinta Mexico à 18 heures et arriva à Mérida à l'heure prévue.

Le mardi 2 Septembre, le groupe alla en voiture à Uxmal-nom qui signifie "trois fois édifiée"- une des zones archéologiques les plus intéressantes de la civilisation maya, où l'on trouve, de grands édifices ornés délicatement et répartis symétriquement.

Le groupe visita tout d'abord la pyramide du Devin -en fait, deux pyramides superposées- en s'arrêtant particulièrement devant la façade du temple primitif magnifiquement orné par des masques du dieu de la pluie; puis le quadrilatère des Nonnes qui est une très grande cour entourée de quatre bâtiments surélevés aux facades décorées avec profusion.

Il admira la construction sans doute la plus remarquable de la ville: le Palais du Gouverneur, de dimensions grandioses, harmonieusement proportionnées et dont la décoration est du style maya le plus classique; et vit ensuite le Temple des Tortues, appelé ainsi en raison du motif décoratif de sa corniche d'une simplicité exquise.

Le groupe passa la nuit à l'hôtel "Hacienda Uxmal", puis partit en voiture pour Chichen Itzá le jour suivant.

Chichen Itza fut fondé au VI<sup>e</sup> siècle; son nom signifie en maya: l'embouchure des Itzaes.

Au nord de la place principale se trouve la pyramide appelée "El Castillo", au sommet de laquelle est situé le Temple du Jaguar qui domine toute la ville, et dont la base en pierre sculptée représente d'énormes têtes de serpent - A l'intérieur du temple on peut voir la sculpture du jaguar rouge.

Les visiteurs observèrent avec grand intérêt l'ensemble formé par le Jeu de Pelote, notamment sa tribune sacrée et le Temple des Tigris.

Finalement, empruntant un chemin qui part de la place, ils arrivèrent au Puits Sacré aussi appelé Puits des Sacrifices pour rappeler les cérémonies religieuses qui s'y déroulaient, énorme puits naturel formé dans du calcaire.

De Mérida où ils rentrèrent certains voyageurs continuèrent leur excursion jusqu'à Cozumel, les autres s'envolèrent pour leur pays d'origine.

Excursion B - Oaxaca.

27 personnes firent cette excursion. Le départ prévu pour le 31 Août à 7h 15, par vol normale Mexico-Oaxaca fut retardé de 4 heures en raison de mauvaises conditions atmosphériques. Ce retard faisant perdre une demi-journée d'activité, l'itinéraire dut être modifié. En arrivant à Oaxaca le groupe fut installé à l'hôtel Victoria où il fut servi un repas de spécialités mexicaines; après le repas, le groupe alla, en voiture, aux ruines de Monte Alban, en compagnie d'un guide.

tions and which was once the scene of religious ceremonies.

The group returned to Mérida, some people boarded flights to their home countries and those registered for tour A-2 left for Cozumel.

#### Tour B.- To Oaxaca.

Twenty-seven persons registered for this tour. The original departure was scheduled for 7.15 a.m., August 31st, in the commercial flight to the city of Oaxaca. The adverse weather conditions forced a 4 hour delay for the departure.

Upon arrival to Oaxaca, the group went to the Hotel Victoria, where a Mexican lunch was served.

Some adjustments had to be made to the program due to the mentioned delay but they meant minor losses.

The first day, after lunch, the group went by car to visit the ruins of Monte Albán, accompanied by a guide.

Monte Albán is an enormous city, the cradle of the Zapotec civilization, where monuments of great archeological interest have been found together with numerous graves, in some of which, particularly in grave No. 7, beautifully worked examples of the goldsmiths' art inlaid in jade, have been found.

The total area of the site is 40 square kilometers, and the city stands at some 2 000 meters above sea level; however, only a small part of the site has yet been explored.

Part of the explored area is known as the Great Square and this was the zone visited by the group.

The tour began at the platform to the north, climbing a great stairway which leads to what must have been a lobby with a roof sustained by columns. From this point the great square could be appreciated in all its magnitude. The visitors then descended one side to pass in front of the buildings designated System IV, where they could admire the main pyramid.

Next to the pyramid it stands the Dancers' Building, decorated with sculptures of human figures in strange positions which gives origin to its name. On the southern platform of the building there are three stone stela.

Northeast of the main square, between one

La grande cité de Monte-Alban est le berceau de la civilisation zapotèque. On y a découvert des monuments d'un grand intérêt archéologique ainsi que de nombreuses tombes, on particulier la tombe No. 7, où l'on a retrouvé des bijoux d'or, ornée de jade et finement sculptés.

Le site s'étend sur 40 Km<sup>2</sup>. à 2.000 mètres au-dessus du niveau de la mer; cependant, seule une partie a été explorée.

Parmi les zones explorées, le groupe visita le centre cérémonial de Monte Alban essentiellement composé d'une vaste esplanade appelée "Plaza Central" entourée de nombreuses constructions et plates-formes.

Les visiteurs se rendirent tout d'abord sur l'énorme plate-forme située au nord de la place centrale en empruntant un escalier aménagé entre deux rampes au haut auquel se trouve un portique à deux rangées de six colonnes. De là, ils purent dominer la "Plaza Central" et en apprécier les proportions. Ils descendirent ensuite par le côté ouest de la plate-forme et allèrent admirer la pyramide principale, en passant devant le groupe de constructions désigné sous le nom de "Système IV".

Un peu plus au sud, se trouve le monument dit des "Danseurs" où l'on peut voir des dalles sculptées représentant des personnages de type olmèque que l'on a dé signé sous le nom de danseurs en raison des leurs attitudes très variées sur la plate-forme sud de l'édifice se trouvent trois glèles de pierre.

Au nord-est de la "Plaza Central", entre le remblai qui l'encadre et divers bâtiments pyramidaux, se trouve le jeu de Pelote de style classique zapotèque.

Le 1er Septembre, après avoir pris le petit déjeuner, le groupe partit pour Mitla, par la route de Tehuantepec, sur le trajet, il s'arrêta pour voir le monument de Benito Juárez et l'arbre de "Santa María del Tuel", un énorme tuplier de 3.000 ans toujours en vie et le plus grand du monde. Après 46 Km de route, les congressistes partis d'Oaxaca, arrivèrent à Mitla. Ils visitèrent le groupe des colonnes dont une des cours, dite "Patio de las Grecas" est entourée de murs ouverts sur quatre salles. A l'intérieur, les parois sont recouvertes de milliers de petites pierres, travaillées avec des instruments rudimentaires et assemblées avec une admirable perfection pour former des frises et des grecques.

Au sud, dans un édifice carré à peu près identique au groupe des colonnes, se trouve une des deux grandes tombes cruciformes, décorée à l'intérieur de pierres ajustées - la deuxième tombe a une sorte de toit soutenu par une colonne monolithique appelée Colonne de la Vie.

Puis ils allèrent voir "El Conjunto de la Iglesia" (l'ensemble de l'église), ainsi appelé car les conquérants ont construit une église sur un des édifices indigènes, avec les pierres des constructions détruites.

of its edges and the buildings constructed in the center there is to be found the Ball Court, constructed in classic Zapotec style. It was here that the visit came to its end, and the members of the group returned to their hotel.

On the first of September, after breakfast, the group left for Mitla, along the Tehuantepec highway. Short stops were made before the monument to Benito Juárez and the tree of Santa María del Tule, an enormous sabino tree some three thousand years old, the largest in the world of its species and still alive.

After a 46 kilometer journey from the City of Oaxaca, the group arrived at Mitla, where they visited the Room of the Columns. The visitors could appreciate in the main patio the extraordinary decoration of the walls built of thousands of small stones finely worked with rudimentary tools and perfectly assembled to form exquisite friises. To the South, in a quadrangular building similar to the room of the Columns, there stands one of the two great cross-shaped tumbs with its interior decorated with great sculptured blocks. The roof of the second tumb is supported by a monolithic column known as the Column of Life.

The last place visited is known as the Church Group, so named because the conquerors built a church upon one of the indigeneous buildings, with stones coming from the already torn-down buildings. On the way back to Oaxaca, a rudimentary loom was visited which was of great interest to some of the visitors. After lunch, the group was taken to the Church of Santo Domingo, considered as characteristic of the colonial period. Its facade is richly decorated in the Oaxaca baroque style and its interior is outstanding with its richly ornamented altars and altarpieces.

The tour ended with a visit to San Bartolo Coyotepec where potters work the black clay typical of the region.

Return to the City of Mexico took place on September 2nd, on a regular flight, and the visitors returned to their respective hotels.

Tour C.- To Villahermosa.

Thirteen people participated in this trip, including delegates, their companions and a representative of the Organizing Committee, who was the guide.

The departure from Mexico City was Sunday morning, August 31st, on a three-stop commexial flight.

Après le repas, le groupe visita le Temple de Saint Domingue, que l'on considère comme très caractéristique de l'époque coloniale. Sa facade est de style baroque-oaxaquém et richement ornée; a l'intérieur, ses autels et ses retables de grande valeur sont abondamment décorés.

Enfin, il alla jusqu'à San Bartolo Coyotepec ou il put observer la fabrication de la céramique noire typique de la région. Il rentra a Oaxaca à 18 heures. Le 2 Septembre, il regagna Mexico par avion.

Excursion C a Villahermosa.

Treize congressistes participèrent à ce voyage, et furent guidés par un représentant du Comité Organisateur.

Le groupe quitta Mexico le dimanche 31 août au matin par la route de Veracruz-Minatitlan-Villahermosa. L'après-midi, il visita les sites les plus intéressants de la ville, et parmi eux le Musée de l'Etat de Tabasco, là de nombreuses pièces archéologiques des cultures olmèque, toltèque, et maya, ainsi que de nombreuses reproductions de stèles, de céramiques et de peintures murales mayas, en particulier celles de Bonampak ont été réunies..

Le lundi 1<sup>er</sup> Septembre, au matin, le groupe visita, dans l'état de Chiapas, la zone archéologique de Palenque, située à 135 Km de Villahermosa - le centre cérémonial date de la période maya classique, qui a atteint son apogée au 1<sup>er</sup> siècle de notre ère. Ainsi vit-il tout d'abord le musée local puis le Grand Palais dans les caves duquel se trouvent des tombes et il se dirigea vers le Palais des Inscriptions. D'autres monuments, tels que les Temples Soleil, de la Croix Feuillue, du Comte, et du Groupe du Nord furent également admirés.

Avant de quitter la zone archéologique, les participants purent nager dans un petit lac qui est formé dans la crevasse d'Otulum et qui est alimenté par des sources proches des ruines. Ils retournerent à Villahermosa dans l'après-midi.

Le mardi 2 Septembre, a onze membre du groupe, quittèrent l'hôtel à la première heure du matin pour visiter le Parc de la Venta qui est un musée en plein air où l'on conserve les énormes têtes Olmèques, sculptées dans des pierres d'une seule pièce que l'on a découvertes en 1954 dans la zone archéologique. Puis ils reprirent la route pour Mexico. Le même jour, le reste du groupe fit une importante visite au barrage de Netzahualcoyotl, construit en terre et en enrochements et, localisé à l'embouchure Raudales de Malpaso, sur la rivière Grijalva, dans l'état de Chiapas. Là, on a visité les parties les plus intéressantes du barrage tels que le déversoir, les prises d'eau, et l'usine hydro-électrique en construction dont la capacité doit être de 720 K W H.



The afternoon was dedicated to visit the most interesting places of the City, such as the University, fountains, Monument to the Heroes of the French Invasion, and the trees where the traitors were hunged.

In the evening the interesting Museum of the State of Tabasco was visited. In this place there are several archeological pieces, originals of the Olmec, Toltec and Mayan cultures and several reproductions of ceramic pieces.

Also, there are copies of the murals of the Mayan monuments, mainly from Bonampak.

On Monday morning, September the 1st, the program indicated a visit to the archeological zone of Palenque, in the State of Chiapas.

The first place visited was the local museum, then the Great Palace, then going down to the bottom to see the graves; the Inscriptions' Palace was visited too, other monuments such as the Temples of the Court, of the Adoration to the Sun, of the Foliated Cross, of the Count and of the North were included in the tour.

Before leaving the zone, the delegates had the opportunity to swim in a natural pool that is formed in the Otulum crack.

In the evening, the group went back to Villahermosa, where they had a free night. On Tuesday morning, September the 2nd, eleven members of the group went to visit La Venta

Park that is an open museum in which the huge Olmeca heads are preserved. These heads are engraved in monolithic stone blocks, they were localized in 1954 within the archeological zone. After this visit, part of the group went back to Mexico City.

The same day, the rest of the group visited the Netzahualcōyotl Dam, an earth-rock structure located on the site named "Raudales de Malpaso", on the Grijalva River in the State of Chiapas. Here they visited the spillway, the intakes and the hydroelectrical plant, still in process of installation.

The sub-group went back to Villahermosa and took the tour to the museum and La Venta Park and then took the plane back to Mexico City.

Tour D-1.- To Guadalajara, and D-2.- Extension to Puerto Vallarta.

Fifty seven participants with a representative of the Organizing Committee started on

Ce groupe est rentré à Villahermosa avant la tombée de la nuit et est allé le lendemain visiter le Musée et le parc de la Venta. Puis il prit l'avion pour retourner à Mexico.

Excursion D-1 et D-2.

57 congressistes accompagnés d'un représentant du Comité Organisateur, participèrent à ce voyage et 12 personnes seulement allèrent jusqu'à Puerto Vallarta.

Le voyage de Mexico à Guadalajara se fit en car, et le retour de Guadalajara ou de Puerto Vallarta à Mexico, en avion.

Le dimanche 31 août au matin, le groupe visita le Musée Colonial du Couvent de Tepetzotlan, ayant ainsi l'occasion d'admirer entre autres les retables, la niche de la Vierge et la facade de l'église de Saint Francois Xavier de style baroque-mexicain du XVII<sup>e</sup> siècle.

Les congressistes déjeunèrent à l'hôtel "la Mension", puis allèrent jusqu'à Guanajuato. Le lundi premier Septembre ils visitèrent dans la ville les Eglises de la Valenciana, de la Compagnie de Jésus et de San Diego, ainsi que la "Parroquia", l'Université, le théâtre Juarez, l'"Alhondiga de Granaditas", et "El Pipila", en passant par de petites rues et par les places de Mexiamora et du Baratillo. Cette ville, une des premières fondées par les conquérants parut aux congressistes très semblable à certaines villes espagnoles dont elle conserve encore le même style architectural. Ils remarquèrent aussi que cette ville fut très importante; elle connut en effet un grand développement au XIX<sup>e</sup> siècle étant le centre d'un empire minier; de plus, d'importantes batailles s'y déroulèrent au moment du mouvement d'indépendance du Mexique. Les souvenirs de son histoire ont été conservés au Musée de l'"Alhondiga de Granaditas".

Le mardi 2 Septembre, le groupe partit le matin pour Guadalajara, deuxième ville de la République Mexicaine, fondée au XVI<sup>e</sup> siècle par le conquérant espagnol Nuño de Guzman.

A Guadalajara, ville de tradition hospitalière, un groupe d'ingénieurs locaux offrit un repas aux visiteurs, dans une ambiance mexicaine nocturne, avec feux d'artifices et défilé de mode.

Le 3 Septembre, le groupe visita la Cathédrale, le Palais du Gouverneur où les visiteurs purent admirer les fresques de José Clément Orozco, l'"Hospicio Cabafias", les parcs "Agua Azul" et "Alcalde", le théâtre Degollado et la maison de l'artisanat où se trouve la poterie mexicaine la plus raffinée. La journée se termina à l'hôtel Camino Real par un dîner.

Le Jeudi 4 Septembre au matin, l'excursion se poursuivit à Chapala, à 50 Km de Guadalajara. Chapala est le lac le plus grand du pays, il est très connu pour son climat agréable et son très beau paysage.

De retour à la ville certaines personnes

tour D-1, but only twelve people went on tour D-2 to Puerto Vallarta.

The group traveled by bus from Mexico City to Guadalajara, stopping at several places of interest, but the trip back to Mexico City was by plane.

Sunday morning, August 31st, the group visited the Colonial museum that is located in the Convent of Tepozotlán, where they had the opportunity of seeing the altarpieces, the Virgin's Chapel and the facade of San Francisco-Javier church, which are Mexican-baroque style, from the XVII century.

Lunch was served at "La Mansión" Hotel and afterwards the trip continued to Guanajuato.

In Guanajuato on Monday, September the 1st, two tours were organized to go around the City.

The following churches were visited: The Valenciana, the Compañía de Jesús, the San Diego and the Parish; other points of interest as the University, the Juárez Theatre, the "Alhóndiga de Granaditas", the "Pípila" statue, the squares of Maxiomara and Baratillo, also a walk through some of the typical narrow streets, were part of the tour.

After this tour the attendants commented that there was a great similarity with some Spanish towns, this is due to the fact that this city was one of the first founded by the conquerors and it still preserves its original style. They observed that the city had been very important long time ago for on the XIX century it was a mining emporium. An interesting fact is that in this city very important battles were sustained during the war of Independence, memories of which are kept on the Alhóndiga de Granditas Museum.

Tuesday morning, September the 2nd, the group departed to Guadalajara, which is the second most important city in the Mexican Republic and was founded by the conqueror Nuño de Guzmán in the XVI century.

In Guadalajara, the De La Torre Constructing Company offered the visitors a dinner with Mexican night's atmosphere, fireworks and a fashion show.

On September the 3rd, the group visited the Cathedral, the Government Palace, the Ca bañas Orphanage, the Blue Water and Alcalde Parks, the Degollado Theatre and the Crafts' House. In this tour the travelers had the opportunity of admiring the murals of José Clemente Orozco, David Alfaro Siqueiros and

quittèrent le groupe pour diverses destinations, les autres prirent l'avion la nuit même pour Puerto Vallarta. Là, les congressistes restèrent les 5 et 6 Septembre à l'hôtel "Posada Vallarta". Durant leur séjour, ils ont profité des jolies plages de ce port et de la simplicité de ses habitants dont les maisons s'accrochent à la montagne et descendent jusqu'au bord de la mer au milieu d'une végétation exubérante. Le samedi après-midi certaines personnes regagnèrent leurs pays d'origine alors que les autres s'envolèrent pour Mexico dans la nuit.

Dans la programme du Congrès était prévu le 30 août 1969 une visite de la zone archéologique de Teotihuacan. Cette visite fut effectuée par tous les délégués et leurs accompagnateurs, en tout plus de 840 personnes.

#### TEOTIHUACAN:

Teotihuacan dont le nom signifie "le lieu où les hommes sont devenus des dieux est, est situé à 39 Km de Mexico. Le départ des 26 cars nécessaires s'est effectué à 9 heures.

A 10 heures la visite à pied commença, partant de la Pyramide de la lune d'où le grand ensemble formé par la Rue des Morts et tous les monuments a pu être admiré.

Puis prenant la Rue des Morts, les visiteurs arrivèrent à l'esplanade située face à la grande Pyramide du Soleil, dont la grande majorité des visiteurs entreprirent l'ascension. Pour visiter la Citadelle et la Pyramide de Quetzalcoatl, un bon nombre de congressistes continua la promenade en empruntant la Rue des Morts, les autres regagnèrent les cars. La visite se termina par la zone Commerciale et le Musée.

A 13 heures le groupe arriva à l'usine thermo-électrique de la Vallée de Mexico située à 29 Km de Texcoco où un déjeuner fut servi. Peu après les congressistes visitèrent rapidement l'usine où ils purent apprécier la stratigraphie de la "Zone de Transition" de la Vallée de Mexico; ainsi que le développement de l'usine où deux unités de 150 Mw chacune sont actuellement en construction.

#### Excursion a Tepozotlan.

Le dimanche 31 août une courte visite fut organisée à l'ancien couvent jésuite, aujourd'hui converti en Musée: "Museo del Virreynato", à 41 Km de la capitale. Un groupe de 55 personnes, formé de congressistes et d'accompagnateurs, fut conduit au couvent par deux cars. Les visiteurs ont admiré l'architecture du couvent et du Temple de Saint François Xavier, de style baroque-mexicain du XVII<sup>e</sup> siècle. Ils parcoururent toutes les pièces intérieures= les cloîtres, la Chapelle Domestique et celle du Novice, etc., où ils trouwerent des peintures et des retables de peintres mexicains du XVIII<sup>e</sup> siècle; ils passerent par les agréables Patios des Aligibes et des Orangers.

Au deuxième étage, ils visitèrent le Mi-

Diego Rivera, who are the three most important muralists of the world.

The day's activities ended with dinner served at the "Camino Real" Hotel.

On Thursday morning, September 4th, the group went to Chapala which is 50 Km. from Guadalajara. Chapala is the biggest natural lake in the country, with very nice climate and beautiful sightseeings. When the group went back to Guadalajara some people concluded the tour there and departed to different places, the remaining members of the group, who wanted to go to Puerto Vallarta, departed on the evening flight.

The attendants stayed at the Posada Vallarta Hotel. On the 5th and 6th of September they enjoyed the beautiful beaches, the charming houses set on the mountain and close to the ocean, surrounded by exhuberant vegetation.

On Saturday afternoon some people went back to their different countries and the rest of the people flew to Mexico City.

#### Tour To Teotihuacan.

As an appendix to the ordinary activities of the Congress a visit to the archeological zone of Teotihuacan was programmed for the delegates and their companions.

Teotihuacan, "where men become Gods", is located 51 Km. North East of Mexico City. It was visited August 30th, for about 840 people.

At 9 a.m. twenty six buses and thirty five guides who spoke English, French and Spanish departed to the archeological zone.

One hour later the visitors were climbing the Pyramid to the Moon, from which they could admire the great complex of monuments and the Deads' street.

They continued the walk along the Deads' street and visited the Quetzal-Butterfly Palace, the temple of the Mythological Animals, the Jaguar's Temple, and the huge Pyramid to the sun, which most of the visitors climbed.

A good number of delegates continued the walk by the Deads' street toward the Citadel; the rest took the buses to the Citadel and the pyramid of Quetzalcóatl.

The visit ended at the commercial area and the Museum.

At 1 p.m. the group went to the Thermoelec-

trador. jolie construction du haut de laquelle on peut admirer une grande partie de la Vallée de Mexico. Ils visiterent enfin l'église de Saint Francois Xavier, caractéristique du XVII<sup>e</sup> siècle. Le groupe admira particulièrement le retable du maître-autel et la Niche de la Vierge.

On servit le repas de la Vierge annexe du Musée. Le groupe rentra à Mexico dans l'après-midi.

trical Plant of the Valley of México, located on kilometer 29 of the road to Texcoco, where a lunch was served. Afterwards, during the visit to the installations, the group was shown a geological profile of this zone of the Valley.

At 3 p.m. the visit was ended and they went back to Mexico City to the their hotels.

#### Tour to Tepotzotlán.

Sunday, August 31st, a short trip to a former Jesuit Convent, at present converted in the Viceroyalty Museum, was organized. This place is 41 Km. from the City.

Two buses with 55 people among delegates and their companions and four guides were conducted to the convent.

The visitors admired the architecture of the Convent and San Francisco-Javier church, of barroque style of the XVII century. They visited the cloisters, the Doméstica chapel and other churches, where there are beautiful paintings and altarpices of Mexican painters from the XVIII century. In this convent one can walk through the "Algibes" and "Naranjos" Patios.

On the second floor it is located the Mirador, with its beautiful architecture and view of the Valley of México.

The San Francisco Javier church was visited, it belongs to the XVII century and the altarpiece of the main altar is extraordinary.

Dinner was served in an annex of the museum and the group went back to Mexico City at 3 p.m.

## REPORT FROM THE EXHIBITION OF EQUIPMENT SUB-COMMITTEE

### RAPPORT DU SOUS-COMITE DE L'EXPOSITION

In the basement of the Convention Center an exhibition was installed covering an area of 3000 square meters.

The Organizing Committee planned this phase of the event with three directive purposes:

1. To give the participants in the Conference an opportunity to become acquainted with various official projects involving research and application of Soil Mechanics in the host country.

2. To invite equipment manufacturing firms to display their latest developments in the line of field instrumentation. Thus, by placing more emphasis on this specific theme, it was believed that visitors would be better able to obtain an overall picture of the best current procedures and instruments for one particular purpose instead of being overwhelmed by an overabundance of multipurpose paraphernalia

3. To complement the exhibit with other lines of equipment or services which, although junior to the exhibition theme chosen, are nonetheless important and cannot be left out. These include drilling, sampling and laboratory testing equipment and new foundation methods.

The exhibition attained a good balance of these three aims. Official exhibits covered 33% of the total area, field instrument manufacturing firms 36% and complementary equipment and services the remaining 31%.

Official exhibitors included the most important government and academic organizations in Mexico: Secretaría de Recursos Hidráulicos, Secretaría de Obras Públicas, Secretaría de Hacienda y Crédito Público (Proyecto Texcoco), Instituto de Ingeniería (University of Mexico), Departamento del Distrito Federal, Comisión Federal de Electricidad and Petróleos Mexicanos.

Field instrumentation was ably represented by a number of firms, including Engineering Laboratory Equipment Ltd., Testlab Corporation, Clockhouse Engineering and Instrument Co., Curtin de México, S. A., Geonor A/S, Telemac S. R. L., Geomeasurements Inc., Soil Instruments Ltd., Slope Indicator Co., Geotech

Une exposition couvrant 3000 mètres carrés fut organisée au sous-sol de la Unidad de Congresos, dans les buts suivants:

1.- Donner aux congressistes des informations sur divers projets officiels liés à la mécanique des sols pratique ou théorique actuellement en cours au Mexique.

2. Inviter les sociétés fabriquant des appareils de mesure in situ à présenter leurs créations les plus récentes, afin de donner aux congressistes un aperçu général des meilleurs procédés et instruments actuels.

3. De présenter en outre certains appareils ou procédés qui bien qu'étrangers au thème général de l'exposition présentent un intérêt spécial, tels que techniques de forage et de prise d'échantillons, essais de laboratoire et nouvelles méthodes de fondations.

Les buts fixés pour cette exposition semblent avoir été atteints. La surface couverte par les projets officiels représentait 33% de la surface totale, les appareils de mesures in situ 36%, les divers matériels et procédés complémentaires 31%.

Les stands officiels ont réunis les plus importants organismes académiques et gouvernementaux du Mexique: Secretaría de Recursos Hidráulicos, Secretaría de Obras Públicas, Secretaría de Hacienda y Crédito Público, (Projet Texcoco), Instituto de Ingeniería, (Université Nationale du Mexique), Departamento del Distrito Federal, Comisión Federal de Electricidad et Petróleos Mexicanos.

Des appareils de mesures in situ ont été présentés par un nombre important de sociétés, en particulier par Engineering Laboratory Equipment Ltd., Testlab Corporation, Clockhouse Engineering and Instrument Co., Curtin de México, S. A., Geonor A/S, Telemac, S.R.L. Geomeasurements Inc., Soil Instruments Ltd., Slope Indicator Co., Geotech (Teledyne Co.) et Bison Instruments Inc.

Parmi les exposants on trouva également les sociétés suivantes: Atlas Copco Mexicana, S. A., Cimentaciones Mexicanas, S. A., Pilcon Engineering Co., Longyear de México, S. A., Cfa., Mexicana Aerofoto, S. A., Cimentaciones Franki de México, S. A., Acker Drill

(Teledyne Co.) and Bison Instruments Inc.

Other exhibitors were Atlas Copco Mexicana, S. A. Pilcon Engineering Co., Longyear de México, S. A., Cía. Mexicana Aerofoto, S. A., Cimentaciones Franki de México, S. A., Acker Drill Co. Inc. Máquinas y Equipos, S. A., Applied Geodata Systems Inc., Joy Manufacturing Co., Laboratorios de la Ingeniería, A. C. Pilotes de Control, A. A., Cimentaciones y Edificaciones, S. A., and Mc. Graw Hill.

The Sociedad Mexicana de Mecánica de Suelos (Mexican Society of Soil Mechanics) also had a stand for distribution of the proceedings of past conferences and other publications.

The Subcommittee in charge of the Exposition was presided by Ing. Héctor M. Calderón, with the valuable assistance of Ings. Lino Hermínio Vite Saldaña, Héctor Ancira and Armando Prieto. It is estimated that over 6,000 persons visited the stands during the Conference.

Co., Inc. Máquinas y Equipos, S. A., Applied Geodata Systems Inc., Joy Manufacturing Co., Laboratorios de la Ingeniería, A. C., Pilotes de Control, S. A., Icos de México, S. A., Geosol, S. A., Geofimex, S. A., Cimentaciones y Edificaciones, S. A., et Mc. Graw Hill.

La Sociedad Mexicana de Mecánica de Suelos (Société Mexicaine de Mécanique des Sols) ouvrit également un stand pour la vente des comptes-rendus des congrès antérieurs et de diverses publications.

La sous-commission responsable de l'Exposition fut dirigée par M. Héctor Calderón, avec la collaboration de MN. Lino Vite, Héctor Ancira et Armando Prieto. Le nombre de visiteurs de l'exposition est estimé à 6000 personnes.