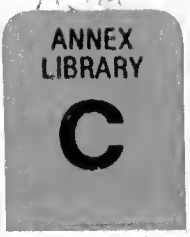


# In Mexico

with the

Special Trains

November, 1901

GENERAL PORFIRIO DÍAZ,
President of the United States of Mexico.

# MEXICAN MEETING EXCURSION

## Excursions and Entertainments Connected with the Mexican Meeting, November, 1901.

(A Supplement to the Official Proceedings of the Meeting.)

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HON. JOSÉ IVES LIMANTOUR, *Minister of Finance.*
HON. JUSTINO FERNÁNDEZ, *Minister of Justice and Public Instruction.*
HON. GUILLERMO DE LANDA Y ESCANDÓN, *Mayor of the City of Mexico.*
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*Local Committee of Chihuahua.*—Gobernador Miguel Ahumada, Enrique C. Creel, Cruz González, Guadalupe González, Forbes Rickard, G. D. Meiklejohn, R. Anderson, Col. John Weir, Col. W. W. Mills, C. Sheldon, Lorenzo J. Arellano, Carlos F. de Landero, J. M. Sánchez, Oton Sartorius, E. H. Cook, Juan A. Creel, A. H. Kraft, Pedro R. Prieto, Manuel Gameros, Salvador Arellano, F. P. Mattox, W. H. Kraft, W. T. Lampe, J. W. Malcolmson, Capt. C. G. Scobell, R. M. Dudley, C. L. Graves, J. M. Wilson, R. J. de Morambert, J. D. McKenzie,

Martin Falomir, Jesús Falomir, Juan Terrazas, Federico Terrazas, Juan N. Faudoa, Alberto Terrazas, Sergio Sánchez, José Elexire, W. G. Gibson, J. G. Sample, Luis de la Garza Cardenas, F. S. Kirkland, J. M. Pender, Vicente Horcasitas, J. Pothast, A. C. Nash, J. F. Treviño, F. H. Husted, Victor Gabrero, Carlos Cuilty, Harvey B. Lawrence, Schuyler B. Lawrence, E. W. Iliff, Charles C. Seawell, G. C. Harding, Benig Perez Gil, G. C. Moye, C. M. Rojas Vertiz, Juan de Dios de Milicua, Guillermo Kraft, Jesus Acosta, J. H. Williamson, Alfredo Kraft, J. D. Meiklejohn, H. Anderson, José D. Riego, Dr. Francisco Armendariz, Santiago S. Cardenas, George F. Brittingham, Eduardo Cuilty, Manuel Gameros, Salvador Atelano, F. P. Mattox.

*Local Committee of Parral.*—Tito Arriola, José Maria Botello, Angel Garcia, Juan Almanzan, Pedro Alvarado, Norberte Domingues, Francisco Gomez, José Larroque, Wenceslao Fuentes, D. Garmendia, Felipe Arellano, Guadalupe Rios, Ramon Gonzalez y Salas, R. J. Long, W. W. Emery, G. A. Burr, Joseph Freudenstein, G. P. Mackie, Charles Preusse, Spencer Cragoe, A. E. Swain, Charles Stork, J. E. Cunningham, William C. Beckman, J. P. Cruger, H. Wendler, N. H. Emmons 2d, J. I. Long, J. Flynn, Carlos Dictmar, J. D. Helm, Edward L. Dufourc, D. M. Evans, Leopoldo Iwonsky, José Palacios, M. A. Warner, E. O. Matthews, D. W. Grubbs, T. H. Thatcher.

*Local Committee of Pachuca.*—Felipe N. Barros, Edmundo Girault, R. Moore, Rafael Flores Alatorre, Ignacio Symonds, Adrian Parres, E. Watters, Enrique Quintanilla, E. Zuloaga, C. Sanchez Mejorado, A. Irizarri, G. Blumenau, A. Spamer, F. O. Renstron, Aquilino Parres, N. Morton, T. Brademburg, J. Sanchez Mejorada, F. Hernandez, Jr., R. Torres, P. A. Gutierrez, Luis Carriom, J. Gonzalez, A. Romera, Dr. Augustin Navarro Cardona, J. Pérez Duarte, H. Rodriguez, R. M. de Arozarena, Froilán Jiménez, Jesus Manzano, Manuel Teja, Pablo Northey, Dr. J. de da P. Jiménez, Alberto Espinosa, Joaquin Martinez, Eduardo del Corral, Miguel M. Bracho, Fernando P. Tagle, Luis Hernandez, Augustin Straffon, Ignacio M. Arciniega, Alvaro Rodriguez, Leoncio Hernández, Alejandro Mondoza, Joaquin Lara, Leonardo Rubio, Manuel Islas, Joaquim Calero, Miguel Alvarez, Jesus Gil, Manuel Ortega Filio, Eduardo Luque, Ramon Revilla, Jesus Icaza, Javier Rosete, Jesus M. Fraustro, Antonio Ramiro, Silvestre García, Arturo Viniegra, Leopoldo Rosales, Ramon Rosales, Trinidad Hidalgo, Antonio Ramiro, Vicente I. Islas, Nemesio Aguilar, Francisco J. Velez, Perfecto C. Omanda, Rafael Aguilar, Vicente Madrid, Jesus Rodriguez, Francisco Sessom, Rodolfo Munoz, Alfredo Bishop, Pedro Rioseco, José Calero, Raul Prieto, Rafael Salazar, Juan Barron, Manuel Ordoñez, Francisco C. O'Gorman, Francisco J. Velez, Ignacio Rivera, Juan Hales, Augustin Inurriteguí, Tomas Soloman, Jaime Bennets, Juan Bennets, Jr., Guillermo Dawe, Carlos Dawe, R. Skewes, Juan Gundry, José Granados, Francisco Rule, Alfonso Granados, G. Bayona, Guillermo Rule, Francisco H. Rule, Enrique Arthur, Juan Pratt, Vicente Roqueni, Doctore Manuel Majera, Gonzalo Castaneda, Arturo Stockdale, Salvador Jiménez, Francisco Rosete, Gabriel Revilla, Guadalupe Sanchez, Ramon Casteneda y Palomar, Trinidad Vazquez, Juan C. Rule, F. C. Jaggy, Trinidad Hidalgo, Enrique Bunt, Juan E. Contreras, Ignacio Blancas, Nye' Morton, Horatio Symonds.

*Local Committee of Guadalajara.*—Gabriel Castaños, *President;* Ignacio Guavara, *Vice-President;* Ambrosio Ulloa, *Secretary;* Gabriel Castillo, Ignacio Guavara, Juan José Matute, Mariano Schiaffino, Daniel V. Navarro, Rafael de la Mora; also the members of the Society of Engineers and leading merchants and bankers.

*Local Committee of Guanajuato.*—Ponciano Aguilar, Joaquin Parres, Roberto Fernandez, L. M. Cockerell, Manuel L. Ajuria, Pío R. Alatorre, Rámon Alcázar,

Manuel Antillón, Manuel Aranda, Manuel Balarezo, G. W. Bryant, Andres Bravo, Juan Castelazo, Ernesto Castelazo, Rodrigo Castelazo, Francisco Castro, Ricardo Chico, Juan N. Contreras, Cornelio Cornejo, Alex. J. Cumming, Eduardo Cumming, Amado Delgado, Dwight A. C. Furness, Jesús Fernández, Juan M. Garma, Enrique Glennie, Ricardo A. Glennie, Luis Göerne, Vicente González, Felipe González, Ignacio Ibargüengoitia, Ignacio A. Lozano, Enrique Medina, M. E. McDonald, Enrique Martinez, G. W. McElhiney, Pablo Orozco, Pablo Parkman, Fernando Parkman, Samuel A. Parkman, José A. Pesqnera, Ignacio Rocha, Atanasio Rocha, Carlos Robles, Francisco Reynoso, Eusebio Rojas, Luis Silva, Amado Saavedra, Ignacio Sánchez.

*Local Committee of Aguascalientes.*—Alejandro Vasquez del Mercado, Alberto M. Davalos, José Maria Gonzales, Ignacio Rios e Ibarrola, Tomas Medina Ugarte, Carlos M. Lopez, Enrique C. Osornio, Leandro Carbo, José M. Alarco, Mariana Cordova, Felipe R. Chavez, William A. Pratt, Robert Brendel, G. C. Kaufman, C. F. Westlund.

*Local Committee of San Luis Potosi.*—Ing. D. Blas Escontria, A. S. Dwight, Roberto Ipiña, D. C. Brown, D. Luis C. Cuevas, Francisco Coghlan, R. Gmelin, Adolfo Martinez, E. H. Messiter, F. H. Taylor, C. M. Van Cleve.

*Local Committee of Monterey.*—C. Piaccini, Ismael Guerra, Luis Guimbarda, Pedro Lambreton, José Armendaiz, Gustavo Dresel, R. L. Kayser, Fernando Martinez, Jas. M. Morlan, Ernestro Madero, Bernardo Reyes, Jr., Andres Garza Galan, Genaro Dávila, Federico Padilla, Romulo Padilla, Manuel Gomez.

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THE convenience and pleasure of members and guests attending this meeting was served, while the expense of the journey was very greatly reduced, through the organization of a special excursion-party by Mr. Theodore Dwight, whose executive ability in this direction, already exhibited on more than one similar occasion, was never more severely tested, or (if the Secretary may trust the unanimous verdict of the travelers concerned) more conspicuously proved, than in this peculiarly difficult case.

The party occupied two special trains, one of which started from New York City, via the Pennsylvania Railroad, on November 1st, at 2.20 P.M. The second train followed the first out of Chicago at 10 P.M. on November 2d.

*Train No.* 1.—This train was composed of the Pullman sleepers "Wildwood" (4 drawing-rooms and 8 sections), "Horatio" (2 drawing-rooms and 7 compartment state-rooms), and "Petruchio" (2 drawing-rooms and 12 sections); the private car "Olympia" (chartered by President Olcott for his own use, one of the large state-rooms of which was kindly placed at the disposal of Mr. Dwight, as an office); and the observation-car "Pacific" (8 sections, bath-room, large parlor and

recessed observation platform). To these were added two 60-ft. Pennsylvania Railroad (Adams' Express) baggage-cars. One of these, fitted up as a refrigerator- and storage-car after designs by Mr. Dwight, carried out of New York over 40,000 lbs. of commissary supplies, in addition to which, over 10,000 lbs. were stored in the dining- and the other baggage-cars. These supplies included about 5000 lbs. of fresh meats, 1000 lbs. of ham, 200 lbs. of bacon, 4500 cans of fruits and vegetables, many barrels of fresh fruits and vegetables, 750 lbs. of fresh butter, 3100 qts. of "White Rock" water, in addition to other supplies required for such a trip in a foreign country, where American food-supplies are often difficult to obtain.

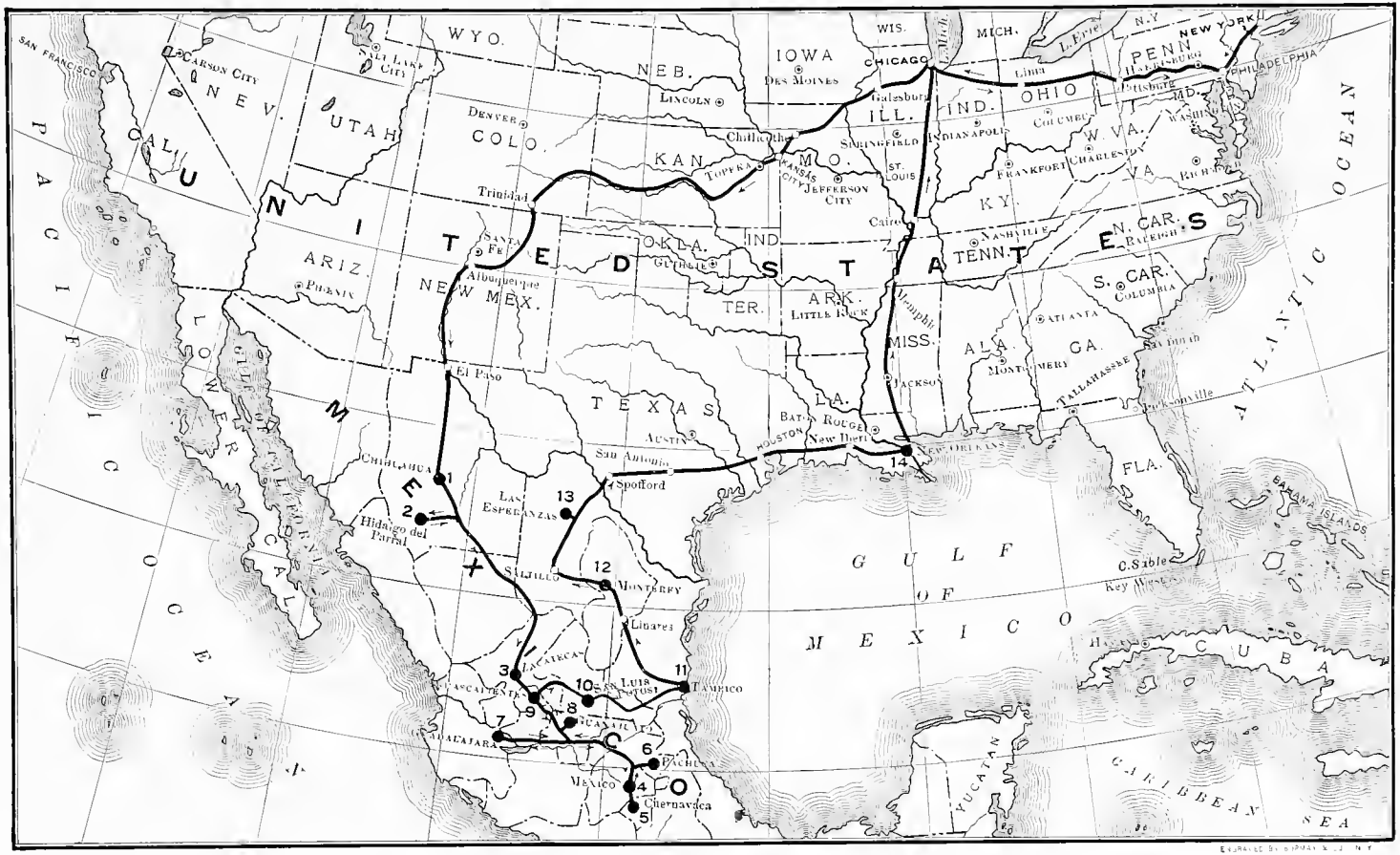
The second baggage-car was provided in one end with bunks to accommodate ten persons, partitioned off from that portion in which the trunks were stored. This was done to eliminate a very serious objection common to the usual tourists' trips, where the cooks and crew are permitted to sleep on the tables and floors of the dining-cars.

The train carried about 85 passengers and a crew of about 22 persons, including, in addition to the regular force of waiters, porters, cooks, etc., a baggage-man, barber, storekeeper and maids.

The journey to Chicago was made without incident. The trip had brought together many old friends, and in the 24 hours' run all others became well acquainted. Owing to the very great weight of the train, the "limited" schedule could not be maintained, and the arrival at Chicago was an hour behind time. The Engineers' Club of that city had extended an invitation to members and guests of which many availed themselves, during their 7 hours' stay, by dining at the Club.

While the party was absent from Train No. 1, it was taken to the Atchison, Topeka and Santa Fe station, and the baggage of those who were to be accommodated on the second train transferred to the baggage-cars of that train.

At 10 P.M. the first train left the station, followed shortly afterward by




Route of the Excursion to the Mexican Meeting, November, 1901.

the second. The intention had been to keep the two sections within a few minutes of each other; but owing to a defective gas-valve in one of the cars of the second section, considerable delay occurred at Kansas City. The "right of way" was thus lost; and the two trains did not come together again until their arrival at Raton, N. M.

*Train No.* 2.—This was composed of the compartment-cars "Bassanio" and "Philario;" the sleepers "Bernardo" and "Cloverdale" (each having 2 drawing-rooms and 12 sections); the private car "Chiricahua" of Dr. James Douglas (which joined the train at El Paso); the observation-car "Aladdin;" and two baggage-cars, one belonging to the Mexican Central

Aqueduct from Chihuahua.

railroad, and the other courteously furnished by the Chicago, Milwaukee and St. Paul Railroad Company.

As regarded the comfort and guidance of passengers, this train was under the charge of Mr. E. W. Parker, of New York City, who kindly volunteered his valuable assistance in this respect.

*General Equipment and Operation.*—No more striking proof of the excellence of American railway equipment and management could be desired than was given by this continuous excursion of nearly 8400 miles, made with trains of exceptional length and weight, over road-beds of variable excellence (and, sometimes, very bad), including extreme grades and sharp

curves. It is not long since the sending of a single car on a journey of such length and character, without opportunity for shop-repairs, would have been deemed a hazardous experiment. And still more hazardous would have been the submission of seventeen cars to such a test. For it must be remembered that whereas, on a single line, under one control, and provided (as are our great transcontinental or trunk-lines) at frequent inter-

The Night Picture of the Illuminated Cathedral at Chihuahua.

vals, with repair-shops, depots of train-supplies or duplicate parts, and even stations where substitute cars could be obtained in an emergency, the result of a break-down in some detail of equipment might be only insignificant inconvenience or delay, such an accident, occurring on a new line, or in a foreign country, far from any available, immediate remedy, would be a much more serious matter. Apart from the difficulty or impossibility of adequate temporary repairs, necessitating the

abandonment of a car and the accommodation of its inmates through the over-crowding of the remaining cars, the simple delay occasioned by such an event, under such conditions, might entirely nullify the whole of the time-schedule, laboriously constructed, and accepted by the different railroad com-

Indian Ore-Carrier at Parral.

panies concerned, so as not to interfere with their regular business and their obligations as mail-carriers.

In other words, after all possible precautions and pre-arrangements, the success of such an excursion absolutely depended, in the last analysis, upon the behavior of the railway equip-

ment furnished; and the mere circumstance that this equipment could be reasonably calculated upon to endure the test of a month's continuous and severe use speaks volumes either for the sanguine temperament of the organizers of such an undertaking or else for American railway construction and administration. The further circumstance that such an expectation was actually justified by the event proves the latter, rather than the former.

There were two trifling break-downs in the plumbing of the two trains, and there was a little trouble with the fittings of the private car "Chiricahua"; but this was all. In the whole

Bull-Ring, Parral.

8545 miles traveled, not one car developed even so much as a "hot box;" and at the end of the 30 days, with all their vicissitudes and varied exigencies, the double party was brought into Chicago on the day appointed, two hours ahead of its schedule-time!

This final triumph was due to the notable run of 923 miles from New Orleans to Chicago, over the lines of the Illinois Central system, upon which the rate already set by a "fast" schedule was so far exceeded as to gain the two hours mentioned. Over many parts of the line the speed of 70 miles per hour was made, without danger or discomfort to the party. Engineers will see at once that this performance shows not

merely the excellence of engines and rolling-stock, but also the perfection of the road-bed.

This remarkable record, besides illustrating the perfection of American railway practice, dictates a hearty acknowledgment of the zealous co-operation of the officials and employees of the various railroads traversed, and especially of those of the Pullman Company. According to the strict rules established for the excursion, no individual fees were paid en route to porters, waiters, etc., but every member of the party gladly subscribed to a purse of about $1800, which was distributed among them at the end of the journey.

The perfection of the commissariat is indicated by the fact that more than 15,000 meals were served on the two trains to the 165 passengers and 45 members of the crews, etc., and to many Mexican local members or Committees received and entertained upon the trains for brief periods. And the Secretary has neither received any report, nor heard any rumor, of a single instance of dissatisfaction with the management of this department.

*Distance Traveled.*—The following memorandum shows the distance traveled by this party from Nov. 1 to Dec. 1, 1901:

| | Miles. |
|---|---|
| New York City to Philadelphia, | 90 |
| Philadelphia to Chicago, | 822 |
| Chicago to El Paso, | 1630 |
| El Paso to Chihuahua, | 226 |
| Chihuahua to Jiminez, | 146 |
| Jiminez to Parral and return, | 110 |
| Parral to Santa Barbara and Minas Nuevas, | 34 |
| Jiminez to Zacatecas, | 416 |
| Zacatecas to Mexico City, | 439 |
| Mexico City to Drainage Canal and return, | 34 |
| Mexico City to Cuernavaca and return, | 150 |
| Mexico City to Pachuca, | 93 |
| Pachuca to Tula, | 44 |
| Tula to Guadalajara, | 331 |
| Guadalajara to Guanajuato, | 194 |
| Guanajuato to Aguascalientes, | 144 |
| Aguascalientes to San Luis Potosi, | 140 |
| San Luis Potosi to Smelter and return, | 6 |
| San Luis Potosi to Cardenas, | 117 |
| Cardenas to Cafetal, | 27 |
| Cafetal to El Abra Falls, | 53 |
| El Abra Falls to Tampico (La Barra), | 84 |
| Tampico (La Barra) to Monterrey, | 327 |

| | |
|---|---|
| Monterrey to Zaragosa and return, | 30 |
| Monterrey to Baroteran, | 195 |
| Baroteran to Coal Mines and return, | 20 |
| Baroteran to Eagle Pass, | 102 |
| Eagle Pass to New Orleans, | 740 |
| New Orleans to Chicago, | 923 |
| Chicago to Philadelphia, | 822 |
| Philadelphia to New York City, | 90 |
| Total, | 8579 |

*List of the Excursion Party.*—The following list contains the names of those who constituted the party:

| | |
|---|---|
| W. P. Agnew, | New York. |
| H. B. Alexander, | Sandon, B. C. |
| R. M. de Arozarena, | Mexico City, Mexico. |
| Mr. Franklin Bache, | Alderson, I. T. |
| Mrs. Franklin Bache, | Alderson, I. T. |
| Mr. Hugh A. Bain, | New York, N. Y. |
| Mrs. Hugh A. Bain, | New York, N. Y. |
| Mrs. S. K. Barker, | Scranton, Pa. |
| Miss Barker, | Scranton, Pa. |
| Mr. E. H. Benjamin, | San Francisco, Cal. |
| Mrs. E. H. Benjamin, | San Francisco, Cal. |
| L. S. Bigelow, | New York, N. Y. |
| Mr. C. E. Billin, | Chicago, Ill. |
| Mrs. C. E. Billin, | Chicago, Ill. |
| Frank S. Bond, | New York, N. Y. |
| Frank Borrow, | Telluride, Colo. |
| Miss Hally R. Bryan, | Washington, D. C. |
| Mr. F. J. Campbell, | Denver, Colo. |
| Mrs. F. J. Campbell, | Denver, Colo. |
| Dr. Thomas M. Chatard, | Washington, D. C. |
| Mrs. Thomas M. Chatard, | Washington, D. C. |
| Maurice Clark, | Mexico City, Mexico. |
| Mr. William Bullock Clark, | Baltimore, Md. |
| Mrs. William Bullock Clark, | Baltimore, Md. |
| W. B. Cogswell, | Syracuse, N. Y. |
| Mr. F. Collingwood, | New York, N. Y. |
| Mrs. F. Collingwood, | New York, N. Y. |
| Mr. A. L. Collins, | Telluride, Colo. |
| Mrs. A. L. Collins, | Telluride, Colo. |
| Mr. Edgar S. Cook, | Pottstown, Pa. |
| Mrs. Edgar S. Cook, | Pottstown, Pa. |
| Miss Eleanor Coxe, | Toledo, Ohio. |
| Mr. Samuel W. Croxton, | Cleveland, Ohio. |
| Mrs. Samuel W. Croxton, | Cleveland, Ohio. |
| Mr. William M. Cummings, | Mexico City, Mexico. |
| Mr. J. H. Devereux, | Aspen, Colo. |
| Mrs. J. H. Devereux, | Aspen, Colo. |
| Mr. W. B. Devereux, | New York, N. Y. |
| Mrs. W. B. Devereux, | New York, N. Y. |
| Mr. Samuel Dixon, | McDonald, W. Va. |
| Mrs. Samuel Dixon, | McDonald, W. Va. |

| | |
|---|---|
| Dr. James Douglas, | New York, N. Y. |
| Miss Douglas, | New York, N. Y. |
| Mrs. J. S. Douglas, | Morenci, Arizona. |
| Master Douglas, | Morenci, Arizona. |
| Mr. Arthur S. Dwight, | New York, N. Y. |
| Mrs. Arthur S. Dwight, | New York, N. Y. |
| Theodore Dwight, | New York, N. Y. |
| Clarence Edsall, | Colorado Springs, Colo. |
| Prof. S. F. Emmons, | Washington, D. C. |
| W. E. C. Eustis, | Boston, Mass. |
| Frederick A. Eustis, | Boston, Mass. |
| Augustus H. Eustis, | Boston, Mass. |
| Thomas M. Eynon, | Philadelphia, Pa. |
| James Eynon, | Philadelphia, Pa. |
| Mr. B. F. Fackenthal, Jr, | Easton, Pa. |
| Mrs. B. F. Fackenthal, Jr., | Easton, Pa. |
| Dr. William J. Ford, | Washington, Conn. |
| Fritz J. Frank, | Chicago, Ill. |
| Walter C. Gayhart, | Austin, Nev. |
| C. W. Haines, | Philadelphia, Pa. |
| Miss Frances B. Hawley, | New York, N. Y. |
| M. Hochschild, | Mexico City, Mexico. |
| Mr. L. Holbrook, | Mexico City, Mexico. |
| Mrs. L. Holbrook, | Mexico City, Mexico. |
| Miss Holbrook, | Mexico City, Mexico. |
| H. L. Hollis, | Chicago, Ill. |
| Charles W. Howard, Jr., | Oakland, Cal. |
| Mrs. Emma S. Howard, | Oakland, Cal. |
| Miss Hyams, | Dorchester, Mass. |
| Mr A. W. Jenks, | Mapimi, Mexico. |
| Mrs. A. W. Jenks, | Mapimi, Mexico. |
| Mr. W. J. Johnston, | New York, N. Y. |
| Mrs. W. J. Johnston, | New York, N. Y. |
| Edward S. Jones, | Scranton, Pa. |
| Mrs. Rufus C. Justis, | Fulton, Ill. |
| Mr. William Kent, | New York, N. Y. |
| Mrs William Kent, | New York, N. Y. |
| C Kirchhoff, | New York, N. Y. |
| George E. Ladd, | Rollo, Mo. |
| Carlos F. de Landero, | Pachuca, Mexico. |
| Pedro A. de Landero, | Pachuca, Mexico. |
| A. Laughton, | Mexico City, Mexico. |
| Mr. John Lilly, | Lambertville, N. J. |
| Mrs. John Lilly, | Lambertville, N. J. |
| Edwin Ludlow, | Baroteran, Mexico. |
| Mr. Frederick W. Lyman, | Minneapolis, Minn. |
| Mrs. Frederick W. Lyman, | Minneapolis, Minn. |
| Miss Lyman, | Minneapolis, Minn. |
| Mr. William R. McIlvain, | Reading, Pa. |
| Mrs. William R. McIlvain, | Reading, Pa. |
| Dr. Henry O. Marcy, | Boston, Mass. |
| Charles W. Miller, | Aspen, Colo. |
| Harry H. Miller, | New York, N. Y. |
| Mrs. R. B. Morison, | Baltimore, Md. |
| E. M. Nolan, Interpreter, | San Antonio, Texas. |
| Mr. E. E. Olcott, | New York, N. Y. |

Mrs. E. E. Olcott, . . . . . New York, N. Y.
Miss Euphemia Olcott, . . . . . New York, N. Y.
Mrs. Neilson Olcott, . . . . . New York, N. Y.
E. L. Oliver, . . . . . San Francisco, Cal.
Mr. E. W. Parker, . . . . . Washington, D. C.
Mrs. E. W. Parker, . . . . . Washington, D. C.
Mr. W. S. Pilling, . . . . . Philadelphia, Pa.
Mrs. W. S. Pilling, . . . . . Philadelphia, Pa.
Miss E. J. Platt, . . . . . Scranton, Pa.
Mr. F. E. Platt, . . . . . Scranton, Pa.
Mrs. F. E. Platt, . . . . . Scranton, Pa.
Mrs. Joseph C. Platt, . . . . . Waterford, N. Y.
Robert E. Plumb, . . . . . Detroit, Mich.
Theodore D. Rand, . . . . . Philadelphia, Pa.
Jacob M. Rich, . . . . . New York, N. Y.
M. P. Rich, . . . . . New York, N. Y.
Prof. R. H. Richards, . . . . . Boston, Mass.
Mrs. R. H. Richards, . . . . . Boston, Mass.
William H. Richmond, . . . . . Scranton, Pa.
Miss Emeline K. Richmond, . . . . . Scranton, Pa.
Miss Clara M. Richmond, . . . . . Scranton, Pa.
Miss Laura Riegel, . . . . . Riegelsville, Pa.
Miss Ida Riegel, . . . . . Riegelsville, Pa.
Prof. Heinrich Ries, . . . . . Ithaca, N. Y.
Mrs. Heinrich Ries, . . . . . Ithaca, N. Y.
Thomas M. Righter, . . . . . Mount Carmel, Pa.
Miss Righter, . . . . . Mount Carmel, Pa.
Miss E. M. Rivinus, . . . . . Washington, D. C.
Mr. Charles Schäffer, . . . . . Philadelphia, Pa.
Mrs. Charles Schäffer, . . . . . Philadelphia, Pa.
Miss Sealy, . . . . . Galveston, Texas.
Miss Ella Sealy, . . . . . Galveston, Texas.
Mr. H. J. Seaman, . . . . . Catasauqua, Pa.
Mrs. H. J. Seaman, . . . . . Catasauqua, Pa.
A. W. Sheafer, . . . . . Pottsville, Pa.
George Singer, . . . . . Pittsburg, Pa.
Miss Lina G. Slee, . . . . . Poughkeepsie, N. Y.
Mr. J. William Smith, . . . . . Syracuse, N. Y.
Mrs. J. William Smith, . . . . . Syracuse, N. Y.
G. W. Steiger, . . . . . Washington, D. C.
Samuel Storrow, . . . . . New York, N. Y.
Mr. John E. Sweet, . . . . . Syracuse, N. Y.
Mrs. John E. Sweet, . . . . . Syracuse, N. Y.
Mr. F. M. Taylor, . . . . . Denver, Colo.
Mrs. F. M. Taylor, . . . . . Denver, Colo.
L. H. Taylor, Jr., . . . . . Philadelphia, Pa.
Mr. Edwin Thomas, . . . . . Catasauqua, Pa.
Mrs. Edwin Thomas, . . . . . Catasauqua, Pa.
Mr. Samuel Thomas, . . . . . Catasauqua, Pa.
Mrs. Samuel Thomas, . . . . . Catasauqua, Pa.
Mr. M. D. Valentine, . . . . . Woodbridge, N. J.
Mrs. M. D. Valentine, . . . . . Woodbridge, N. J.
Miss Anna T. Van Santvoord, . . . . . New York, N. Y.
M. A. Vielé, . . . . . Schenectady, N. Y
Miss Weightman, . . . . . Philadelphia, Pa.
Charles H. Welles, . . . . . Scranton, Pa.

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| H. E. West, | Libby, Mont. |
| Mr. A. H. Wethey, | Butte, Mont. |
| Mrs. A. H. Wethey, | Butte, Mont. |
| L. H. Whitham, | New York, N. Y. |
| Mr. William H. Wiley, | New York, N. Y. |
| Mrs. William H. Wiley, | New York, N. Y. |
| Mr. David Williams, | New York, N. Y. |
| Mrs. David Williams, | New York, N. Y. |
| B. Williams, | San Francisco, Cal. |
| L. Williams, | Milton, Cal. |
| Mrs. L. Williams, | Milton, Cal. |
| Mr. Jones Wister, | Philadelphia, Pa. |
| Mrs. Jones Wister, | Philadelphia, Pa. |
| Miss Wister, | Philadelphia, Pa. |
| Mr. Oscar Wolff, | Baltimore, Md. |
| Mrs. Oscar Wolff, | Baltimore, Md. |
| Walter Wood, | Philadelphia, Pa. |
| H. H. Yard, | New York, N. Y. |

It should be added that, besides the persons above named, the sessions of the meeting and many of the local excursions were attended by many of the 130 members of the Institute resident in Mexico, and by numerous other engineers and guests.

*Chihuahua.*

The party arrived at Chihuahua on Nov. 5th, at about 6 P.M., several hours behind schedule-time, by reason of the excessive weight of the two special trains, which are said to have been the heaviest that ever entered Mexico.* Notwithstanding this serious interference with the plans of the Local Committee, its programme was carried out with energy, night being turned into day for this purpose. On arrival at the railway-station, the party was immediately conveyed in carriages to the magnificent State Palace, where it was received by Governor Miguel Ahumada with an address of welcome in Spanish, to which President Olcott made an appropriate reply in the same language. The guests were then presented individually to the Governor. A large and excellent band, consisting of pupils of the School of Arts under 16 years of age, furnished appropriate music; and an elegant refection was served in an adjoining room.

A large part of the night, after 9 P.M., was devoted to a brilliant ball, given in honor of the visitors, in the *Theatro des*

* In justice to the Mexican Central Railway Co., it should be said that nearly all this loss of time was incurred between Kansas City and El Paso.

*Héroes*, a handsome building erected by the State. The array of Mexican beauty and fashion presented on this occasion added

Aqueduct at Queretaro.

greatly to the splendor of the scene, and, together with the interesting novelty of the Mexican dishes served at the midnight

Chapultepec Palace.

supper, constituted a characteristic and impressive introduction to the hospitality of the Republic and its citizens.

Wednesday, November 6th, was occupied with visits to points of interest in and about the city, conducted by English-speaking guides. Some of the party visited the *Descubridora* "manganese"-mine, a few miles distant, the ore of which car-

Popocatepetl, from Sacremonte.
(Photograph by Henry M. Stanley.)

ries $6 gold and 10 to 14 oz. of silver per ton, with 18 per cent. of manganese, 2 of iron, and 15 to 20 of silica, the remainder being carbonate of lime.

Coaches were provided by the Local Committee for the use of the visitors on all occasions.

Special trains were provided by Messrs. C. S. Sheldon and A. S. Dash, managers, respectively, of the Chihuahua and Pacific and the Chihuahua Mineral railway of Santa Eulalia, to run to Miñaca and Santa Eulalia.

During the evening, the band of the School of Arts gave a promenade concert on the main plaza, which was elaborately decorated with flags and bunting, while the façade and spires of the Cathedral were brightly outlined and illuminated with innumerable twinkling lights. The smaller plaza in front of the Governor's palace was also illuminated, and the festive scene was full of picturesque and fascinating variety.

The adjectives of praise, admiration and thanks will necessarily be employed again in this narrative; but they will not have been in any later instance more thoroughly deserved than they were on this first notable occasion of the Institute trip in Mexico. The lavish and thorough preparations and the unwearied courtesy of Governor Ahumada and the Local Committee; the cordial co-operation of the citizens and ladies of Chihuahua; the interesting features and typical spectacles presented by the city, and the great historic, present and future importance of this State as a mining field, combined to establish Chihuahua in the memory of its guests beyond the danger of eclipse by any subsequent experience, however splendid.

From the pamphlet guide and programme furnished by the Local Committee, the following particulars have been condensed as worthy of preservation:

Chihuahua, a city of 35,000 inhabitants, and the capital of the largest State of Mexico, was founded early in the seventeenth century by the Spaniards, who worked the rich mines of the surrounding hills. Some of these are still productive.

Those of the Santa Eulalia district, 15 miles east of the city, have been in operation for 300 years, and are estimated to have produced silver and lead to the value of nearly $2,000,000,000. The present output is more than 300 tons of ore

daily, running from 30 per cent. of lead and 40 oz. of silver per ton to still higher values.

Chihuahua ranks first among the States of the Republic as a mining region. The present product of gold and silver bullion alone (not including ores shipped to smelters for treatment) exceeds $800,000 monthly, of which $250,000 is exported to the United States and England. The chief producers of silver bullion are the Batopilas Company ($180,000 per month); J. J. Waterson, Ocampo ($50,000); El Concheño ($56,000); Pinos Altos ($42,000); Santa Eduviges ($38,000); Belen Co. ($25,000); and El Refugio Co. ($24,000). Among the few properties in

Study in Bronze.

this State which produce gold exclusively are La Gloria and Cerro Colorado, near Batopilas (reported to produce, together, $44,000 per month); the Guazapares mines (which have yielded in the past an enormous amount of ore, and have been purchased lately by a strong American company, with a view to extensive developments); and the Placer of Santo Domingo (likewise recently acquired by a foreign syndicate, which is now expending more than $500,000 gold in new machinery and plant). The largest known Mexican gold-nuggets have been found in the last-named district.

The principal mining camps of the State are Santa Eulalia, Parral, Jesús María, Batopilas, Guadalupe y Calvo, El Con-

cheño, Pinos Altos, Santa Barbara, Cusihuiriáchic, Magistral, Dolores, Guazapares, Morelos, Urique, La Descubridora, and Corralitos. The largest copper-mines are at Magistral and Guaynopita.

Chapel of the Well, Guadalupe. (Photo. by H. M. Stanley.)

The construction of the proposed Kansas City, Mexico and Orient railroad is expected to increase greatly the productiveness of many districts.

For all these mining regions the city of Chihuahua is the distributing center, and their progressive prosperity will in-

crease its importance. Fortunately, under the able administration of Governor Ahumada (who is now serving his third term),

First Shrine in Mexico City.

the future of the city has been worthily provided for by the introduction of modern municipal improvements, among which may be specially mentioned, as due to his wisdom and energy,

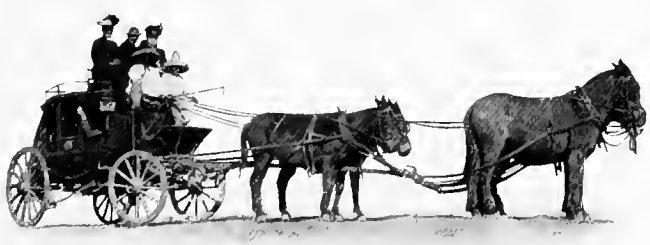
Typical Pulqueria.

the public-school system, water-works, sewers, macadamized streets, and the State Theater.

The city contains a number of important industrial establishments, including the large La Paz textile-mill; a fine brewery; a very extensive meat-packing and canning factory (with capacity to handle 300 head of cattle per day); and, most interesting of all to members of the Institute, the iron- and steel-works of *La Compania Industrial Mexicana*, of which the following account is taken from the *Iron Age* of Nov. 21, 1901:

"La Compania Industrial Mexicana is under the management of Juan A. Creel, an exceedingly progressive and alert Mexican, a native of Chihuahua, who, with his brother, Enrique C. Creel, is identified with the different industries and with extensive mining enterprises. Mr. Creel, who was partly educated in the United States, began his career in a local bank, and has now, at the age of 35, reached the point where he can work out his patriotic desire of devoting his abundant energies to the uplifting, from an economic point of view, of his countrymen and to the development of the extensive, though still largely dormant, resources of the State. Mr. Creel took hold of the Compania Industrial Mexicana in 1893, when the plant consisted of a small foundry and machine shop. Under his management it has prospered and grown, and is still expanding rapidly. A most interesting feature of much significance which has taken place simultaneously with this development is the education of native labor to the rank of skilled artisans. In 1893 the Mexicans were employed only as common laborers. To-day, when running full, the plant has 550 men on its pay-rolls, of whom all but about 50 are natives. They have taken their places as molders, pattern-makers, machinists, rollers and melters, callings unknown to them until now. They are paid the same wages as those earned by the American mechanics, the machinists receiving $3 to $5 per day, Mexican money, while the pattern-makers earn as high as $6, Mexican, per day,—wages which, in gold, are about on a par with those paid in the United States.

"The plant consists of a 15-ton Wellman tilting basic open-hearth furnace, equipped with a Wellman charging machine, the steel being cast into groups of small ingots on cars, bottom-casting having been adopted. The two bottom runners are of such dimensions that after the sprues are cut off a 4-inch billet is produced, which can be rolled into shapes for which an absolutely perfect surface is not necessary. The pig-iron is purchased in the United States, but the works use largely old car-wheels, and, of course, depend upon the country for the



wrought scrap. Purchased muck-bars are the raw material for such iron bars as are rolled.

"The rolling-mill, which is equipped with a modern heating-furnace, has a 12-inch and an 8-inch train, and produces bars down to ⅝-inch rounds. It is driven by two engines, both of which were built in the works.

"There is a large foundry and a good-sized machine-shop, crowded with Amer-

At Real del Monte.

ican tools, although a number of the tools were made in the shop. The company make a specialty of mining machinery, stamp-mills, slag- and metal-pots, etc., and build Corliss engines up to 1000 horse-power. In the shops, in course of erection at the time of the visit of the engineers, was a 1000 horse-power horizontal Corliss compound engine for an electric plant. The foundry makes also miscellaneous castings, and quite recently the manufacture of stoves has been

Lodgings for Man and Beast.

(Photo. by Cox & Carmichael).

taken up. There is a brass-foundry and a special department for the manufacture of valves, this being the only plant of its kind in Mexico. All the parts of the plant outside of the rolling-mill are driven by electric motors, the engine being a product of the shops. There is now in course of erection a new electric plant,

housed in a building the structural work of which was furnished by the American Bridge Company. It is large enough for an equipment of 10,000 horse-power. The present electric installation is supplying the town with light, but has reached its limit of capacity in that direction. The fuel used for the boilers is wood and coal, the latter costing $12 per ton for Mexican and $18 for American coal. The plans are being drawn for a very large new machine-shop, the old one having outgrown its quarters.

"Friends of Mr. Creel relate a recent experience which illustrates both his enterprise and the difference between foreign and native management. At a short distance from Chihuahua is a copper-mining property which has passed through the hands of several English companies, the last having spent about $1,000,000. As an indication of the chararter of the work done, the fact may be cited that the slags made by the smelter ran 2 per cent. of copper. The property, being regarded as a complete failure, was hawked about in vain. Mr. Creel finally purchased mines and smelter for $25,000, Mexican money. He put in new machinery at the smelter and made improvements which cost in all $92,000, Mexican currency. In 14 months the entire outlay had been recovered, and the company, known as the Rio Tinto Mexicana, is earning handsomely."

## *Parral.*

Delegations from the Local Committee boarded the two sections of the excursion-train *en route*, early in the morning of Thursday, November 7th, and many miles away from their stopping-place. Reaching Parral at 11 A.M., the party was met by the remainder of the Committee, with a brass band, at

the railway station. After an address of welcome from the Mayor, Sr. Don Tito Arriola, they were divided into three parties, one of which, under the guidance of Mr. Edward Du-

Chapel of Aranzazu, Guadalajara.

foure, the American superintendent of the Montezuma Lead Co., visited the Santa Barbara district (15 miles from Parral, on a branch of the Mexican Central railway); another was conveyed over the Parral and Durango narrow-gauge railway to Minas Nuevas; and the third inspected the mills and other points of interest in and around the town itself.

At 4 P.M. the three parties were reunited and conducted, through a vast crowd of peons in picturesque costume, to the *Bodega*, a large warehouse, which had been emptied, re-plastered, kalsomined and decorated in their

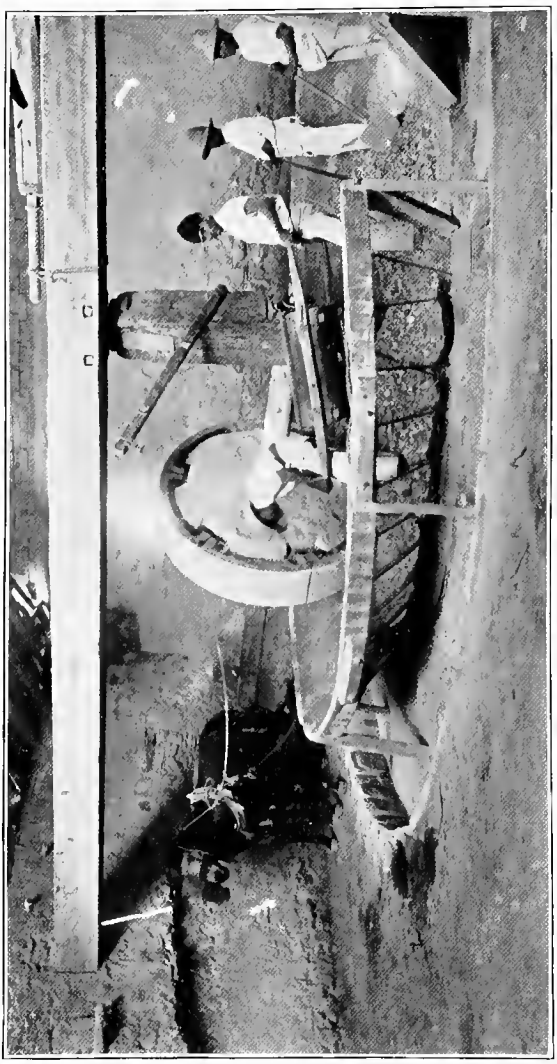
honor, to partake of an elegant banquet, for the several courses of which sundry distant localities had been drawn upon. Oysters came from Corpus Christi; fish from Tampico, on the coast of the Gulf of Mexico; and strawberries from Irapuato.

On entering the spacious hall thus extemporized, the guests

Church of San Francisco, Guadalajara.

were showered with *confetti* by the ladies of the city, while the band played "The Star-Spangled Banner."

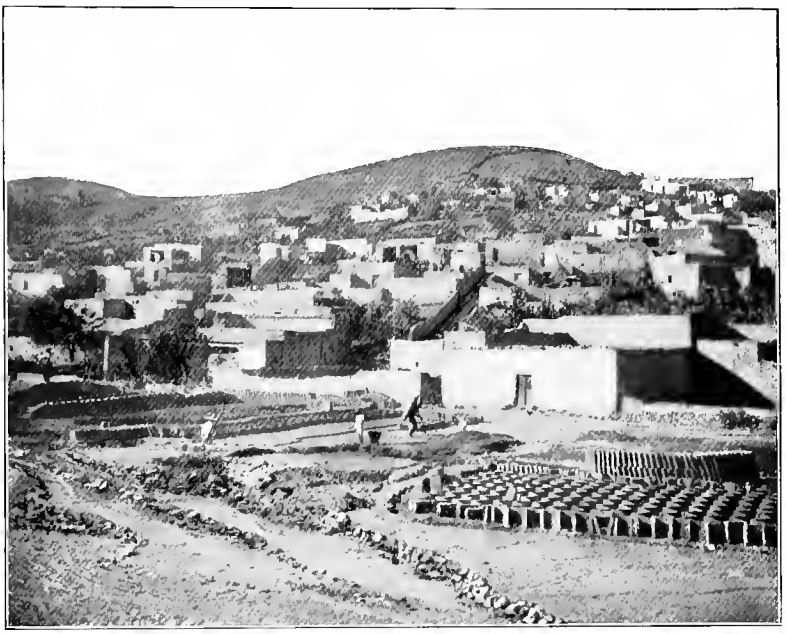
Here, as in many other places in Mexico where the representatives of the Institute were entertained, the portraits of Hidalgo, Juarez and Diaz, who occupy in the history of that



Chilean Mill Run by Mule Power at Guanajuato.

Republic places of honor and esteem corresponding to those of Washington, Lincoln and McKinley in the United States, were prominent among the festal decorations. This fact was gracefully utilized by Sr. Don Felipe Arellano, member of the

National Mexican Congress, who, as the appointed representative of the municipal authorities and the Local Committee,



Making Adobe Bricks, Guanajuato.

offered at the close of the banquet, and in the English language, the following address and toast:

"*Ladies, Young Ladies, and Gentlemen:* I am not going to make a speech; there is not time for that, and I am not master enough of the English language to say all that ought to be said on this occasion.

"Appointed by the first political authority of this city to offer you this ban-

quet, I will only say a few words to you, to express, if my lacking knowledge of the language of Shakespeare allows me to do it, the gratitude of the inhabitants of this mining district for your kindness in coming to visit our mountains.

San Francisco Church at Marfil.

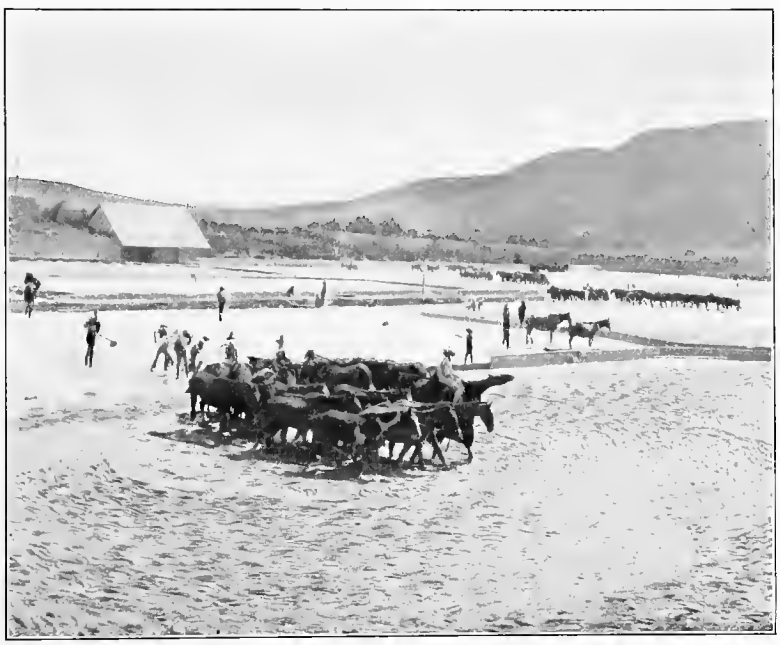
"Yes, the miners and merchants of this city and its neighborhood feel themselves very happy to see you here; and they tender to you their most warm thanks for your visit. Everybody here has felt happy and honored to shake

hands with you this morning, and hopes that this visit of some of the most distinguished engineers of the United States will be of great benefit to this mining district. Please accept, then, our thanks, and the assurance that your short stay here will be always remembered with pleasure.

"Please have the kindness to accept, too, this poor banquet as a token of our good will. We know that it is really poor; but we hope that you will accept it so, taking into consideration our lack of proper means to receive and to entertain such distinguished guests as you are.

"Please, too, accept the little silver spoons and the historical book of our town and mines, which an especial commission is going to put in your hands before we leave this table, as a testimony of our high esteem and gratitude to all of you.

"And now, distinguished Ladies and enlightened Gentlemen, Good-by, Good-



The Patio Process.

by to you all! May God bless your way wherever you go; may fortune and happiness be always your lot in the struggles of life; and when you return home, when you kiss again the flourishing and rosy cheeks of your little ones, turn back your looks towards Mexico, and then remember, and never forget, the new but true friends that you leave in Hidalgo del Parral! But, then and now, forget and forgive the imperfect use that I have just made of your sweet and native language.

"Now, let us drink to the United States, the country of Washington, father of freedom in America, and of Lincoln and McKinley, the two great, courageous and glorious redeemers from slavery; not only the United States, but also Cuba, Puerto Rico and the Filipinas; to Mexico, the country of Hidalgo, Juárez and Porfirio Díaz; to the two sister Republics, the first on the American Continent and in a great part of the civilized world; to General Porfirio Díaz, President of

Mexico, the great warrior and statesman, who in a short period of time has raised so high the name of the Mexican Republic; and to Colonel Theodore Roosevelt, the brave leader of the 'Rough Riders' before the walls of Santiago de Cuba, and now the able President of the United States of America!

"*Señores: Digamos ahora todos, en el magestuoso idioma de Cervantes:* VIVA LA FRATERNIDAD UNIVERSAL!"

A suitable response to this eloquent address was made by President Olcott; and the remainder of the day, together with the early evening, was spent in informal social entertainments, including a visit to the Casino, where a ball was in progress. At 9 P.M. the special trains left Parral.

The "historical book" mentioned in the address above quoted was a beautifully illustrated souvenir, entitled *Hidalgo del Parral, a Mining District Abounding in Mineral Wealth, Indian Legends and Interesting Superstitions*, from which the following

At Marfil.

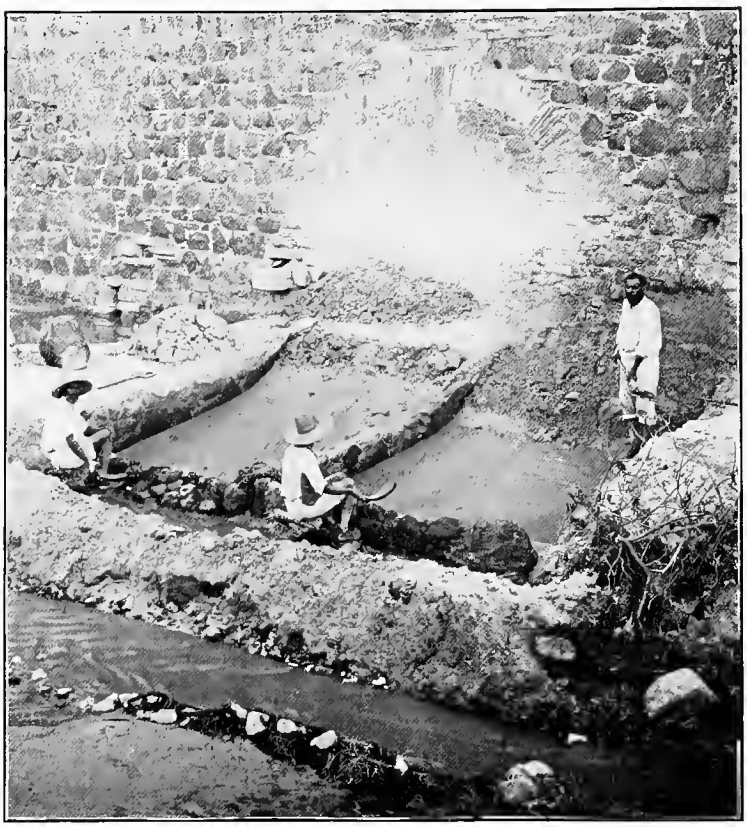
account has been condensed, with the insertion of some additional remarks from other sources:

The exact date of the first discovery of ore in Parral cannot be fixed. That it was before 1652 is proved by a report of that date by the Alcalde, Capt. A. Guerra, which mentions 29 mines as working in what was evidently the mine now called the *Jesús María*, and 14 in the "*Negrita*," evidently the present *Tajo*. The town-record of mines and denouncements (locations) for 1632 shows great activity in mining at that period. All the municipal records earlier than 1612 are lost; but it is known that the town was established considerably before that date.

Prior to 1634 the mines were worked for gold only; but in that year Gov. Don Gonzalo Gomes de Cervantez reported to the Marquis of Sinaloa that ores had been discovered carrying 12 oz. of silver per 100 lbs., and that some of these could be successfully amalgamated, while others must be smelted. The records of 1634 show 4 amalgamating-works and 20 smelters in operation.

In the Parral assay-office, the record from 1641 to 1847 shows 569,741 *marcos* (or 4,557,741 oz.) of silver; and it may be inferred that after a few years of decline, between 1634 to 1641, there was a considerable revival of the industry. From 1649 to 1688, however, the registry of only 313,472 *marcos*

(2,507,776 oz.) of silver indicates another decline. Such fluctuations are doubtless due to the fact that, with the crude early methods of mining and reduction, only very rich ores could be mined with profit, so that the condition of the industry depended from year to year upon the opposing factors of the exhaustion of old *bonanzas* and the discovery of new ones, rather



Washing Tailings.

than upon the systematic and continuous working of the same mines.

The old records from 1688 to 1718 were destroyed by the French during their intervention in Mexico, a century and a half later; and only a few facts can be now gleaned from the remaining documents.

It may be inferred from the records that from 1718 to 1820

the immediate vicinity of Parral maintained a considerable output, mostly or wholly from shallow workings. The later records of this period frequently refer to Parral as containing ores of low grade but boundless quantity. What was meant by "low grade" at that time seems to be indicated by the statement (in a petition for the establishment of suitable reduction-works) that the ores contained only 12 oz. of silver per *carga* of 300 lbs.—or, say, 80 oz. per ton!

Guanajuato.

It is hoped that a full account of the ore-deposits and mining industry of this district, prepared by a competent hand, will be published hereafter in the *Transactions* of the Institute. Meanwhile, the following scanty notes are reproduced from the little book of the Local Committee.

Parral is located in the foot-hills of the Sierra Madre, the main range of which forms an imposing background to the series of successive elevations which ascend, step-like, from Jiminez, on the great Mexican plateau. From this place a branch of the Mexican Central railroad runs to, and about 60 miles beyond, Parral. With the completion of this branch to Parral, about three years ago, the present revived activity in mining began. Previously, ores were hauled by wagon to Jiminez, and shipped thence to Socorro, N. M., El Paso, Texas, or Mapimí, Mex., for treatment.

In the immediate vicinity of Parral the general rock is "porphyry," which contains strong and well-defined veins, carrying siliceous silver-ores low in lead. Large bodies of low-grade ore, formerly not profitable, will now be mined by economical modern methods and machinery, and concentrated or reduced in the district. It is reported that the mills completed during the last two years, or now under construction, have a capacity of 1200 tons of ore daily.

*Santa Barbara.*—This place, 10 m. SW. of Parral, in the most important part of the general Parral district, is the oldest camp in northern Mexico. It was founded in 1547 by Spanish explorers, who are reported to have opened ten gold-mines, producing from 12 to 14 oz. of gold per *carga* of 300 lbs. (= 12 *arrobas* of 25 lbs.), supplying 700 *arrastres*, and supporting a population of 7000. In 1580, Santa Barbara was the seat of the Spanish viceroy, who ruled over what is now the western and southwestern part of the United States, as well as the northern part of Mexico.

San Luis Potosi.

Early in the 17th century the prosperity of Santa Barbara seems to have been interrupted by a general "stampede" of miners to the new district of San Diego de Minas Nuevas—now simply Minas Nuevas—of which mention is made below. The official records have little to say of the older camp for some two hundred years. It is noted that early in the nineteenth century foreign capital was invested, especially in the Mina del Agua, which was sunk 60 ft. below the water-level, and then abandoned. (In 1892 this

mine was reopened by a foreign company, which realized from it in a few months, and with small outlay, a net profit of more than $80,000.) There are also allusions to extensive gambocino ("gopher") workings on all of the larger veins, which proved, as usual, profitable to the operators, but ruinous to the mines and the camp.

The general country-rock at Santa Barbara is slate and shale, traversed by N.–S. veins, dipping 45° to 75° E. Of these, the Tecolotes and the Mina del Agua can be traced for 3 or 4 miles over the mountains. Pockets of very rich gold-ore were found near the surface; but below the oxidized zone the grade was much lower, though the quantity of ore is large and regular.

Making Tortilla.

*Minas Nuevas.*—The origin of this camp was later than that of Santa Barbara, but doubtless considerably earlier than 1645, which is, however, the first date of a mining location now accessible in the books at Parral. In 1657 there were fourteen competing ore-buyers in the camp—a proof of considerable production at that time. The first mine in the district is said to have been the *Veta Grande*, located on the *Veta Colorado*, which is the strongest vein in the district, and, perhaps, in Mexico. Its outcrop is plainly traceable for ten miles over the mountains, and averages, so far as it has been developed, 500 ft. in width. The deepest mine on this vein is the *Veta Grande*, the incline of which has reached the depth of 1250 ft. (about

1000 ft. vertically), and shows at the bottom a vein from 15 to 18 ft. wide, assaying from 40 to 50 oz. gold per ton. Other old and new mines on the vein are the *San Francisco de la Mereña* (700 ft.); *Nopal* (700 ft.); *Preseña* and *Alfareña* (900 ft.); *Biscayna* (about 600 ft.); *El Verde* (about 1100 ft.); *Los Muertes* (680 ft.); *Pachuqueña* (700 ft.); and the *Quebradillas*, the south end of which has been worked to the depth of 550 ft.; while the north end, opened within the last 10 years, and now in *bonanza*, is 725 ft. deep. (The figures above given all signify inclined depth, unless otherwise specified).

The Brute and the Burden.

The ores from this vein are red with iron oxide—whence the name *Veta Colorado*.

*Zacatecas.*

On Friday, November 8th, at 4 P.M., the party reached Zacatecas. At this place no official reception had been arranged; but a stop of some three hours enabled the guests to see the quaint and interesting old city; and a small number of them visited a neighboring mine. Zacatecas lies at an altitude of 8000 ft., has 45,000 inhabitants, and was founded in the middle of the sixteenth century. The district is said to have produced, from 1548 to 1810, gold and silver to the value of nearly $10,000,000.

*The City of Mexico.*

The capital was reached at 4 P.M. on Saturday, November 9th. Among the numerous visits and social entertainments offered to the Institute during the meeting were the following:

*Monday, November 11th.*—Inspection of the Library, Hall of

Models, Meteorological Observatory (commanding a magnificent panoramic view of the city), and Mineralogical and Geological Cabinets of the School of Engineers; visits to the National Library, the Cathedral, etc., and (in special electric cars) to the suburbs.

*Monday Evening.*—Reception given by the *Ayuntamiento* of the City in the Municipal Palace.

*Tuesday, November 12th.*—Visit to the National Museum and the Academy of Fine Arts. Reception by President Díaz in the beautiful castle of Chapultepec (built by the Viceroy of Bernardo de Galvez, and completed by the Emperor Maximilian). Visit to Guadalupe; inspection of the sampling- and testing-works of Heckelmann & McCann (the only establishment in Mexico where experimental working-tests for the concentration and metallurgical treatment of ores are made). In the evening, a reception and ball at the American Club, given by the American residents of the City.

*Wednesday, November 13th.*—Special excursion via the Hidalgo and Northern railway to inspect the great drainage-works of the Valley of Mexico,

recently completed. From the City to San Cristobal, where the railroad crosses the canal, the party were the guests of Sr. Don Gabriel Mancera, the owner of the road. At San Cristobal they were taken in charge by Sr. Don Luis Espenosa, chief engineer of the contracting company which built the works. In the afternoon, a banquet, provided by the Local Committee, was served at Zumpango. The table was decorated with flowers, and a series of large glass vessels, containing the three famous red, white and green national varieties of *pulque*

Saddle Mountain, Monterrey.

punch, flavored respectively with the juice of the prickly pear, almond and celery. The *menu* was composed of Mexican dishes.

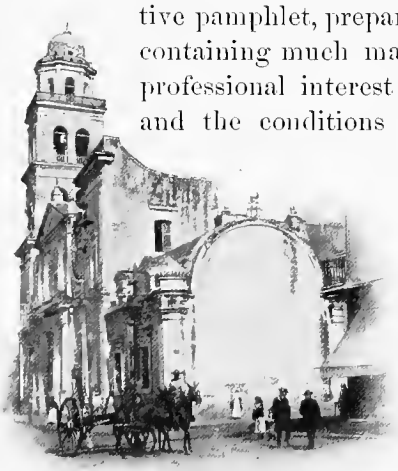
*Wednesday Evening.*—Musical Reception and Tea, tendered by the railway, banking and mercantile circles, and the engineers of the City, at the restaurant in the gardens of Chapultepec.

*Thursday, November 14th.*—Special excursion over the Mexican, Cuernavaca and Pacific railroad to Cuernavaca, in the State of Guerrero. This is one of the famous scenic lines of the Republic. After crossing the valley of Mexico, the road ascends the mountain-side, traversing the lava-beds, to an alti-

tude of 10,400 ft. Then it drops rapidly 5000 ft. into the rich valley of the Morelos, with Cuernavaca in the center. The snow-capped peaks of Popocatepetl and Ixtaccihuatl are almost continuously in sight. The town is in the tropical zone, and the last 75 miles of the trip brought the party from the temperate climate of the plateau to the tropical plain, with its sugar plantations and coffee trees. The chief attractions were the Borda gardens, commenced in the middle of the last century by a French miner, and still very luxuriant and attractive, though their fountains and terraces show the results of long neglect. The plaza, market-place, old Cortez palace, and other ancient buildings at Cuernavaca, are very interesting. The railroad has been completed through the Igualo cañon to the Balsas river, which it will follow to the Pacific at Zihuatanejo, thus opening to commerce the dormant mineral resources of the State of Guerrero and the agricultural section of the State of Morelos.

The excursion-party returned about 9 P.M. to the City of Mexico; and at midnight the special trains departed for Pachuca, which was reached early on Friday morning.

During their stay in Mexico, the visitors were furnished with a guide-book to the city and *environs*, and an admirable descriptive pamphlet, prepared by the Local Committee, and containing much material of historical, scientific and professional interest concerning the localities visited, and the conditions and prospects of the Republic. The greater part of this material will be found in the two following papers, by members of the Institute, which will be separately published in the usual way, as personal contributions to the *Transactions*:



"The City and Valley of Mexico," by Prof. Ezequiel

Ordoñez, Sub-Director of the National Geological Institute, Mexico, Mex.

"A Sketch of Mexican Railroads," by Victor M. Braschi, Mexico, Mex.

*Pachuca.*

Early in the morning of Friday, November 15th, the two trains arrived at Pachuca, the home of Sr. Don Carlos F. de Landero, a Vice-President of the Institute, and the leading spirit in the reception of his fellow-members throughout the Republic. Pachuca is famous also in the history of Mexican mining, and especially as the birthplace of the *patio* process.

The travelers were awakened at 7.30 by the strains of a military band, and, upon leaving the cars, were cordially welcomed by the Local Committee, headed by the Mayor, Sr. Don Rodolfo Munoz, and conveyed in carriages to the Palace, where, at 8.45 A.M., they were received by His Excellency, the Governor of the State of Hidalgo, who, by the way, spent his time almost exclusively for the next two days in cordial contributions to the entertainment of the guests. After an exchange of addresses, and the distribution of programmes, etc., containing useful information, the party resumed their carriages (vehicles of various capacity, drawn by from 4 to 11 mules each, and collected from a large region, to meet the special demand for transportation) and were driven $3\frac{1}{2}$ miles to the Santa Gertrudis mine, 2000 ft. above sea-level, where extensive preparations had been made for their reception. Those who desired to go underground were conducted into the mine-workings. There are five principal shafts for hoisting and pumping, respectively 242, 245, 470, 420 and 202 meters deep. The absence of timbering and the protection by arches of masonry of all drifts, etc., not in solid rock, is an interesting feature of this and other mines of the district. This mine has produced since 1878 about $25,000,000 (Mex.) in silver.

The most remarkable sight above ground here is the new Cornish pumping-engine, built in 1898 by Buckle & Co., Limited, of Plymouth, England, which was, at the time of this visit, ready to begin to run regularly, but had been run, in fact, but a few hours. The *Engineering News* of Nov. 28, 1901, gives the following description of it:

"The steam cylinder is 90 in. in diameter and 10 ft. stroke, and its pump-plunger 9 ft. stroke and 18 in. diameter. The pump-rods are 500 meters, or 1600 ft., long. Its capacity is 1000 English gallons per minute, or, translated into American terms, about 1,750,000 gallons in 24 hours.

"This enormous engine is said to have cost over $100,000 gold. It requires a large house to contain it; and, besides, it requires a special steam capstan—a large drum driven through a worm-gear by a double upright engine—to erect it or to remove its parts for repairs. The engine has the old Watt parallel motion and the cataract valve-gear of the eighteenth century. An engine of this type has probably not been built in the United States, except possibly in California, for over 30 years, but it appears still to be built in England. The only reason for its being in this mine is that its former management was English. The present owners and managers are Mexicans, and they would not have bought such an engine. Matching the engine in out-of dateness is a new battery of Cornish boilers; but these we did not see, as they were covered over with a floor, to make the boiler-room into a banquet hall for our entertainment."

A sumptuous banquet, served in the great boiler-house of the mine, which had been specially floored to accommodate 400 guests, was followed by numerous enthusiastic speeches in Spanish and English, of which the following, delivered by Captain Tomas Soloman, is preserved as containing much valuable information:

"*To the Visiting Members of the American Institute of Mining Engineers, their Families and Friends:*

"*Ladies and Gentlemen:* It is with much pleasure that we welcome you to Santa Gertrudis, and we heartily thank you for the honor you have conferred upon us in coming into our midst to-day. We hope that your visit to Pachuca will be both an agreeable and profitable one, and that your general tour will be successful in every respect, and that you will take away with you many happy impressions and remembrances of this sunny land.

"I have been requested to give you a brief outline of the history of this ancient and justly renowned mining district, and principally of this property on which you are now standing, and which is one of the most important mining propositions of this country. I have also been asked to express my views of Mexico and her people.

"The records we have of the oldest mines in this vicinity we owe, perhaps, to the researches of Humboldt. Another authority, however, Mr. W. P. Robertson, has made the statement that those of Real del Monte had been worked fully three hundred years before the advent of Don Pedro José Romero de Terreros, an enterprising Spaniard, who was afterwards created Conde de Regla. He came in 1749, and several years of prosperity were the fruits of his administration. After his death, adversity came to his heirs, and the liabilities on the mines increasing, they found it convenient, in 1824, to enter into a contract with the English Taylor Co., with the result that the mines were leased to this powerful and widely known corporation for a period of twenty-one years. This company, with ample capital at their back, entered with expensive enthusiasm into the work of development, and in the following year, 1825, three ships, each of 300 tons burden, arrived at Vera Cruz with machinery, which machinery, owing to the difficulties of communication in those trying days, did not reach its destination until the following year. This English syndicate's success was so indifferent that in 1848 they entered into liquidation, with a loss said to have reached the sum of $5,000,000.

"The local British colony, which has numbered as many as 600 souls, may be looked upon as the importation of the Taylor Co., and is still a force to-day in the encouragement of mining in the State of Hidalgo.

"I may say, in passing, that I fear you will not find much to interest you here in the mechanical line, and you may fail to add to your scientific attainments through an inspection of our machinery plants, because they have all been imported. In any case, having come, as you all have, from the greatest Republic, which is to play such an important part in the history of the future, you will not expect too much from us. We hope that the time is not far distant, however, when Mexico will cease to be under the necessity of bringing so much machinery from abroad. With such an influx of foreign money, we can anticipate the erection of extensive concerns to be devoted to the construction of all that we need. Mexico's resources are practically inexhaustible, and there is an immense field here for the remunerative investment of capital.

"Turning to Santa Gertrudis, there are indications of work having been done on this spot during the Spanish occupation, and the venture appears to have been abandoned at some period, owing to the excessive cost of deep mining. It is not known exactly, I believe, when the attention of the English was first attracted to this property, but it seems to have been transferred from one to another during many years until 1875, October 25th, on which date it was acquired by Messrs. William Stoneman and Christopher Ludlow, the former a worthy pioneer and authority on mining, and the latter still a deserving resident of Pachuca.

"These gentlemen, having insufficient means to continue their explorations and provide drainage facilities, decided eventually to form a small company among their friends, and many stories are told of offers of fortunes in stock made to and declined by them, their faith being at a very low ebb. In 1877 Señor José de Landero y Cos was induced to subscribe for two bars (a bar being $\frac{1}{32}$th), Captain Francis Rule and others also taking stock. Shortly after the formation of this company ore was discovered by accident whilst timbering, and the bars were soon quoted at $5000 each, after the total assessment per bar had only

amounted to $80. In 1878 dividends to the amount of $28,800 were paid. In 1879 a Cornish pump and steam hoist were installed on the new vertical shaft to the west, thus enabling the company to reach a depth of 240 meters. In 1890 a second Cornish pump was necessarily erected on another shaft to the east (the San Guillermo), for the purpose of lifting the water to the original pump. Up to 1883, if exception be made of the frequent and unfortunate changes of executive and management, everything went well. In that year Captain Francis Rule accepted the management, and, subsequently, was elected to the Board of Directors, with Señor Francisco Hernandez, Secretary of the State of Hidalgo, and Señor Francisco Rosete as associates; and they continued uninterruptedly in office until July of this year, when they resigned, and were succeeded by Messrs. José de Landero y Cos, Agustin Inurritegui and Manuel Algara, three gentlemen of vast experience and undoubted integrity.

"From 1878 to 1883 the Santa Gertrudis Co. paid in dividends the sum of $921,600, and from 1883 to 1886 only $158,400. Within this latter interval a cross-cut, at a depth of 200 meters, was driven south, and another lode was discovered; and this, forming a junction to the east with the old lode, made Santa Gertrudis the great mine she is to-day.

"The net profits distributed from 1886 to 1901 reached a total of $2,487,020,

A Mexican Four-in-Hand.

not including dividends to free shareholders. The company's records from their commencement show a

| | |
|---|---|
| "Total production valued at . . . . . | $33,637,024.14 |
| "With a total expenditure of . . . . . | 24,570,893.36 |
| "Thus leaving a net profit to the stockholders of . | $9,066,130.78 |

"We have on this property 3 main shafts and 15 levels, the 16th being now opened up at a depth of 430 meters at the bottom of the San Francisco shaft.

"It is intended that said San Francisco shaft shall, with its new machinery, be the center of operations, the other engines being dispensed with. This installation has been put in at an enormous cost. I could enlarge very considerably on this data relating to Santa Gertrudis, but I know that your time is limited.

"As regards Mexico, I feel that there is a grand future before her, and we shall all watch her evolution with deep interest. As to her people, perhaps I should entrust the task of extolling them to one more capable and more impartial. As I have only received kindness from them, my esteem is profound. But I will say that the Mexicans, as a whole, are intelligent, loyal, sympathetic, courteous and hospitable; and the foreigner who conducts himself as a gentleman among

them, doing his duty and nothing more, is treated by them as one of themselves, and with every desirable consideration. I deprecate all charges against individuals and authorities from men who have suffered in Mexico through behavior entirely hostile and reprehensible. If this country, ladies and gentlemen, has not already taken her proper place among the greater nations, it is because of the internal dissensions of the past, which had retarded her progress and civilization. But be sure that the blood of her heroes has not been spilled in vain, and that, under the banner of such as the great statesman who wields her destiny to-day, General Díaz, her pre-eminence is assured. In agriculture, mining, industrial enterprises, railway construction, education and general refinement, our Mexican brethren are making rapid strides. Were this not the case, ladies and gentlemen, the Pan-American Congress would not have assembled on Mexican soil, neither would I have had the most distinguished honor of my life, that of addressing such a learned and representative assembly as the one now before me."

On the return to Pachuca, a visit was made to the Hacienda de Guadalupe, a silver-reduction works, employing the *patio* process. The crushers and Chilean mills, which prepare the ore for the *patio* amalgamation, are driven by electric power.

The evening of Friday was occupied with a session, at which two papers were read, as reported in the official *Proceedings*. To these papers, and especially to that of Sr. Ordoñez, reference may be had for further data concerning the mining of the Pachuca district. It may be added here, that, according to the list prepared by the Local Committee, the metallurgical works of Pachuca comprise four *haciendas*, namely, *Loreto* (100),* *Guadalupe* (80), *La Luz* (70), and *La Purisima* (40), employing the *patio;* one, *Del Progreso*, practicing the Boss system of pan-amalgamation; and two, *La Union* (90), and *Bartolome de Medina* (50), in which a modification of the Kroenke method is used.

On Saturday, November 16th, a small party of guests remained in Pachuca to visit the haciendas above named, and the new Bronson concentrating-works, erected by an American on the stream which receives the tailings from all the Pachuca reduction-works. The whole stream is pumped through this plant, and mercury, amalgam and heavy slimes are caught in riffles and upon canvas tables. Mr. Bronson expects to recover $300 per day in this manner from the final waste of the mills.

By far the larger portion of the guests spent this day in a memorable excursion to the mining district of *Real del Monte*. The usual multitude of carriages and saddle-horses provided for those who wished to ride conveyed them, by a fine road,

* The figures in parenthesis give the capacity in tons of ore daily.

some 12 miles to the mining camp. After viewing the mines (for an account of which see the paper of Sr. Ordoñez already cited), the party proceeded to a magnificent oak grove, which crowns the mountain. From the crest of the divide a magnificent prospect was obtained, including the snow-clad crater of


Popocatepetl. The following account of this episode is taken from the *Engineering and Mining Journal* of Nov. 30th—a special number, devoted to the Mexican meeting, and reflecting much credit upon the editors, publishers and correspondents of that periodical:

"In this country the lower hills are barren of all forest growth, but at elevations of between 8000 and 9000 feet, one enters suddenly into areas heavily tim-

bered with live oaks and other evergreens. At the border of one of these groves crowning a high divide, between two valleys, the citizens of Pachuca had constructed a temporary dining pavilion, capable of seating about 700 guests. Large out-of-door kitchens had been built of brick, and here a score or more of cooks prepared the Mexican dishes, for which the mountain air and exercise of the morning had furnished the proper appetites. The writer will not attempt either to name or describe the viands. They were truly Mexican both in name and character, but it was not necessary to know what they were in order to do them justice. They were washed down (lixiviated, so to speak) with tricolored pulque and other liquids. With the champagne came the usual speech-making, which was characterized by brevity and good feeling. Mr. Olcott's address, delivered, as usual, in Spanish, was full of appreciation of the hospitality and courtesies which had been showered upon the Institute. Toasts were drunk to the Mexican flag and to President Díaz, and the luncheon closed with three rousing American cheers for the hosts of Pachuca and Real del Monte. After the luncheon, dancing in the open air was indulged in for an hour or so, and at 5 o'clock the long cavalcade started down the mountain for Pachuca. The return trip was made in about one-fourth the time required for the ascent, and the city was reached in good time, for departure was set for 6 o'clock. It is not reflecting the least upon the entertainment at other points to say that the day at Real del Monte was the most enjoyable one yet experienced. At each stop new surprises awaited the excursionists; and if it were possible to kill with kindness and hospitality, Mexico would be guilty. From all sides the welcoming hand was extended, from the highest officials to the lowest peon. At every town the streets were lined with rows of the poorer classes, who looked with curiosity and smiling faces at the visitors, who were, in turn, just as curious, and just as pleased."

To the foregoing account the Secretary adds, by request, the following description, furnished by one of the enthusiastic diners, of one of the delicious Mexican dishes served at the banquet.

"Lamb cooked as follows: The carcass, cut into large sections, is placed in sacks made of the fiber of the maguey plant. A large pit is dug in the ground; the bottom is covered with glowing coals, and these are overlaid in successive order with a light covering of soil, then a sack containing the meat, another light layer of soil, another of coals, and finally a high bank of earth. This method cooks the meat to a delicious tenderness."

An admirable institution at Pachuca is the Scientific Institute, a good modern school for the education of mining engineers, surveyors and assayers, which occupies the thoroughly renovated and reconstructed building of an old Franciscan monastery.

Saturday evening, the indefatigable Governor and Local Committee sped the parting guests with a final farewell at the railway-station.

*Tula.*

A number of the guests, leaving Pachuca early Saturday afternoon, and subsequently rejoining the special trains, went ahead by train to Tula, from which station they enjoyed a delightful walk to the famous Aztec ruins in its vicinity.

*Guadalajara.*

Sunday morning, November 17th, found the travelers among the great irrigated fields and prosperous *haciendas* of the fertile semi-tropical Lerma valley and plain, the granary of Mexico. At the station of Castillo, a delegation from the Society of En-

gineers of Jalisco, headed by Vice-President Don Ignacio Guevara, boarded the train for a preliminary greeting.

Guadalajara, the second city in Mexico as to size (population 107,000) and capital of the rich State of Jalisco, was reached at 11 o'clock. After an address of welcome, delivered at the railway-station by Sr. Don José S. Schiaffino, a venerable member of the Society of Engineers, and a suitable response by President Olcott, the visitors were left free from public engagements for the rest of the day, which was, in fact, a welcome day of rest, after the fatiguing though delightful activities of the week. The magnificent cathedral, a few blocks from the station (with its famous Murillo Madonna), as well as the streets and market-place, were inspected with interest.

Monday morning, November 18th, the day's programme began with a car-ride along the *Hospicio* Avenue to the City Orphan Asylum. This remarkable institution covers a large block, and is divided into 23 *patios*, or courts, embellished with orange- and palm-trees, fountains, etc. It comprises schools of various kinds, including trade- and manual training-schools, in which one of the interesting occupations is the making of the characteristic Mexican "drawn" lacework and embroidery. The institution is managed by the State, and has about 600 inmates, representing the poor of all ages.

After visits to the cathedral, government palace, and other features of the city, a trip was made by mule- and steam-cars to the picturesque Barranca de Oblatos, about 7 miles from the city. This is a cañon 1500 ft. deep, in the bottom of which are the municipal water-works. A Mexican breakfast, served in a casino on the brink of the precipice, was followed by national dances by the rancheros, accompanied with music from a large band. Sr. Don Ambrosio Ulloa, Secretary of the Society of Engineers of Jalisco, made a graceful address, to which President Olcott responded.

The following account of this locality is taken from the *Iron Age* of November 28, 1901:

"The Lerma river empties into Chapara lake to the southwest of Guadalajara, this lake, the largest in Mexico, being about 90 miles long by about 30 miles wide. Although there are no large towns, there live on its banks about 150,000 people. From this lake arises the Santiago river, which, after a drop of many feet at the Salto Juanacatlan, the Mexican Niagara Falls, flows to the Pacific in what is practically a cañon, or 'barranca,' for over 100 miles. The depth of the

cañon varies from 1000 to 1600 feet, and in some of its parts the walls are sheer on both shores. At the point visited the banks consist of a series of terraces of surpassing beauty. Looking down into the cañon, there is visible the lower portion of a canal and the power-house of an electrical station, which furnishes power for lighting and for textile and other mills and factories in Guadalajara. The canal was built by three parties, and through subsequent events the supply


has been divided into three parts, the owner of only one of them having thus far developed it partially. There is a head of 65 meters, and there is available in all about 10,000 horse-power. It is proposed soon to convert the present horse-car lines of Guadalajara into electric lines, and there is also a project on foot to utilize the power at the Salto Juanacatlan."

On the way home, a visit was made to the School of Arts, a

fine building, not yet completed, containing a foundry, machine-shop, carpenter's shop, etc., for the instruction of boys. This institution is under the care of the clergy.

A visit was also made to the American Sanitarium, a branch of a similar institution at Battle Creek, Mich.

The festivities of the day were concluded with a grand evening concert, given on the plaza, by the celebrated bands of the 27th battalion and the State Guard, and a ceremonious farewell at the railway-station. Loaded with large quantities of the interesting Guadalajara pottery, purchased during their visit, the party left the hospitable city at 11 P.M.

*Guanajuato.*

Early in the morning of Tuesday, November 19th, the trains reached Marfil, the railroad-station three miles from Guanajuato, where the Reception Committee, with the usual band, received the party, and escorted them to the town. The trip was made in mule-cars, through the narrow gulch lined with old *haciendas*, mine-dumps, etc., and the still narrower streets, running between one-story adobe and stone houses, to the commodious three-story building of the Guanajuato Club, which was the headquarters of the Institute during its two days' stay in this quaint, curious and interesting, as well as in many ways important, mining center. Here they were welcomed by many American and English, as well as Mexican, members.

The first professional visit was made to the reduction-works of the Guanajuato Cons. Mining and Milling Co., now under enlargement, which will increase the former 20 stamps to 60. The ore is pulverized, concentrated on Whilfley tables, and then amalgamated in pans. A walk of half a mile along the mine-railroad track led to the opening of the old mine, and another half-mile through an adit-tunnel, lighted by electricity, brought the party to the present underground workings, where the ore, broken about 80 ft. below the tunnel-level, was carried to that level in sacks on the backs of men, who ascended a very steep stone stairway. The miners were naked except for a small loin-cloth. It is reported that there is now in sight $5,000,000 worth of ore, to say nothing of vast quantities yet to be uncovered.

Lunch was served at the handsome building of the State

College. As one of the reporters remarks, "from the nature of this entertainment, it appeared that the fame of the previous

ones had traveled ahead of the special trains, and the citizens of Guanajuato had determined to excel, if possible, the attempts

made at other towns." But the same authority adds that "it is not possible to make any comparisons!" A pleasant novelty, however, and a grateful reminiscence of home, was presented on this occasion in the circumstance that the menu was composed almost entirely of American dishes. After lunch, the interesting mineralogical and geological collections of the college were visited, and, still later, a trip was made by mule-cars to *La Presa*, where the narrow gulch is divided by dams into a series of lakes, surrounded by beautiful parks, the mountain-sides and narrow bottoms being occupied by the handsome houses and gardens of the wealthy residents of Guanajuato.

In the evening, the fine new Juarez theater and other State buildings were illuminated in honor of the visitors, and a ball, attended by the Governor and many of the Mexican citizens and ladies, was given at the Club, after which the party returned to spend the night upon the special trains at Marfil.

On Wednesday, November 20th, a memorable saddle-trip was made by the gentlemen of the party. Horses were furnished through the courtesy of the Governor, who ordered a troop of cavalry to report at the Cantador Park, dismount, and turn over their horses to the visitors. The ladies and others of the party meanwhile visited the old catacombs, the American hospital, and other points of interest.

The equestrian party visited the Esperanza reservoir (which has a stone dam 33 meters in height, and one of the finest in the world), and the *Valenciana*, *Cata*, *Mellado* and *Rayas* mines on the *Veta Madre*. (See descriptions below, and also the paper by Prof. W. P. Blake, separately published, entitled "Notes on the Mines and Minerals of Guanajuato, Mexico.")

Both companies of excursionists met at the State College for lunch, and subsequently visited the historical *Granaditas* building and the Flores *patio* reduction-works, where 40 *arrastres* were in operation.

From the souvenir-programme distributed by the Local Committee the following account is taken:

"This district has always had the reputation of being second to none of the mining centers of this Republic for its producing capacity of the precious metals. The City of Guanajuato has a population of 41,243 inhabitants, the greater number of which are exclusively dedicated to mining. It is situated in one of the gulches on the western slope of the Guanajuato Sierra. The first buildings date from the year 1554.

"The surrounding mining territory covers an area of 784 sq. kilom. between two parallel lines 28 kilom. in length, which run NW. to SE., the course of the 'Mother lode.' This lode is crossed in every direction by numerous mineralized ledges, the junction of which with the Mother lode increases its great width, thereby forming one of the largest and richest deposits in the Republic. Of this extensive mining ground but a small proportion has yet been explored.

"The ledges that traverse this region may be considered as the constituents of three, or rather four, different systems.

"1. The *Veta Madre* system forms the center of a group of which the remarkable lode that bears this name is the widest, and has been the most productive. It runs NW. and SE., dipping 45° SW. Several other veins run parallel to it, while others are known to come in contact with it from a distance of over 1500 m. in different directions, forming thereby this extensive system.

"2. The *La Luz* system, considered as second to that of the *Veta Madre*, is situated 4 kilom. SW. of the main system. It is formed by two different groups of veins that cross one another. One group runs NW.–SE., parallel to the *Veta Madre;* some of its veins dipping SE. and others NW., and converging towards the surface. The other group is formed of veins that slightly differ from the N.–S. direction, some dipping W. and others E. The crossings of the NW.–SE. with the N.–S. veins have coincided with the large *bonanzas* of this region.

"The first mine worked in the Guanajuato district was the *San Bernabe*, discovered in 1548 by pack-mule drivers traveling from Mexico City to Zacatecas. It is situated 13.5 kilom. NW. of this city, on the vein now called the *La Luz*, belonging to the N.–S. group, and dipping W. As an abundant producer of rich gold-ore this vein has always been remarkable.

"3. The *Monte de San Nicholas* system, comprising several veins, lies 4.5 kilom. SE. of the Mother lode, and parallel to it in course and dip. The veins of this system are noted for their abundant production of high-grade gold-ores.

"4. The *Sierra* system includes the *Santa Rosa*, *Fragua* and *Villalpando* veins, which slightly converge to the N., with a course similar to that of the Mother lode. Several dip SW., and others in a contrary direction; both converging towards the surface.

"The argentiferous minerals contained in the veins of this district are simple sulphides, sulpho-selenides, antimonial sulphurets and native silver. These occur plentifully in all the rich deposits found up to date. Chlorides and bromides occur very seldom. There is more or less gold in all the ores, and it is notable that all the veins to the SE., in the rhyolitic porphyry, carry high-grade gold-ores, containing generally free gold, but in exceptional cases selenides and tellurides, or gold contained in the iron pyrites.

"The deepest workings in the district are the *Valenciana* shaft on the Mother lode and the *Asuncion* shaft in the *La Luz* region. The former is sunk to a depth of 530 m., and the lowest workings of the mine are 1668 m. above sea-level. The latter is 419 m. deep, and at the lowest point attained 1870 m. above sea-level. In the *Sierra* region the depth of 2000 m. above sea-level has not yet been reached.

"For want of the necessary data, the production of gold and silver from the Guanajuato mines prior to 1701 cannot be stated with accuracy. Humboldt, in his *Political Essay*, attributes to them a very heavy production. According to coinage-statistics, the yield in the years mentioned below was as follows:

| | |
|---|---|
| From 1701 to 1800, . . . . . | $279,690,689 |
| " 1800 " 1829, . . . . . | 85,775,642 |
| " 1830 " 1887, . . . . . | 277,608,876 |
| | $643,075,207 |

"The imperfect system of reduction employed until 1866 warrants the opinion that these represent only about 60 per cent. of the contents of the ore mined."

Returning at 4 P.M. to Martil, the party left soon after.

*Aguascalientes.*

Early in the morning of Thursday, November 21st, the special trains arrived at Aguascalientes. Here the excursionists were welcomed by the Local Committee and conveyed to the State Palace, where they were received by Governor Sagreda, after which a visit was made to the smelting-plant of the American Smelting and Refining Co., the following notice of which is taken from the *Engineering and Mining Journal* of November 30th:

"Aguascalientes is a central point to which the smelting-ores from Parral, Chihuahua, Ameca, Pachuca and other mining districts in the Republic are sent for reduction. The works at present are undergoing extensive alterations under the supervision of Mr. Cyrus W. Robinson, chief engineer for the company. These alterations, which will cost about $650,000 in gold, will be finished about next June. In the meantime, no interruption to the operations of the plant has been caused. From 1100 to 1200 tons of copper and silver-lead ores and concentrates are being smelted daily. The product, which, of course, varies in quantity according to the contents of the ores treated, consists of blister-copper and base bullion (silver-lead), which are shipped to Perth Amboy, N. J., for refining. When the alterations are completed, the capacity of the plant will not only be largely increased, but many economies of operation will be effected, and a great saving made in the condensing of the furnace gases, which at present carry off a considerable value. The plant will then be a strictly up-to-date establishment, with electrical equipment throughout, and equal to anything of the kind in the United States. Even now it stands out in striking contrast to the mining methods employed in Mexico generally, where nearly all of the labor is performed by peons, and where mechanical installation is at a minimum."

Lunch was served in the mess-hall of the company's officials, and, returning to the city, many of the travelers availed themselves of the famous warm baths, supplied by the springs to which the town owes its name. A grand band-concert in the afternoon in the San Marcas garden, and another in the evening in the *Plaza de la Constitucion*, completed the day's experience, and at midnight the special trains proceeded on their way.

*San Luis Potosí.*

Friday morning, November 22d, the party was welcomed at San Luis Potosí by the Local Committee, with a military band.

The remainder of the day is well described in the following paragraphs, from the *Engineering News* of December 5, 1901:

"The Local Committee escorted us to street-cars, which took us to the Government Palace, where we shook hands with Señor Ingeniero Don Blas Escontria, Governor of the State of San Luis Potosí, and a distinguished engineer. He made us a speech in Spanish, which Mr. Olcott translated for our benefit, and then replied to it in Spanish. We were then taken back to the station, and thence by train to the smelting-works of the Compania Metallurgica Mexicana. This is a splendid works, thoroughly modern, turning out silver-lead bullion and copper matte, which are shipped to the United States for refining. It is owned by Americans, and is in charge of an American engineer, Mr. A. S. Dwight, who acted as chairman of the Local Committee. Besides the sampling works, the smelting and roasting furnaces and the machinery, there is in the works a plant for making tannin extract out of the bark of the wood which is used for fuel. The bark is ground and then leached in large vats, and the weak solution thus obtained is concentrated by boiling in a vacuum pan. The extract is exported for use in tanneries.

"The social features of our visit to the metallurgical works surpassed anything of the kind that we have yet experienced. Mr. Dwight has a commodious residence close by the works, with a large porch on the second story, looking out on a magnificent view with high mountains in the far distance, and in front of the house was a large and beautiful garden, in which were set tables shaded with awnings and decorated with flowers. All of this was at our disposal for a resting-place during our visit, and at 1 o'clock an excellent lunch in the American style was served by an efficient corps of waiters.

"At 2.30 P.M. the train carried us back to the town, and the party broke up into groups to visit different places of interest. Several of us visited the furniture-factory of Jorge Unna & Co., and the tobacco-factory of Señor D. Antonio Delgado Renteria. The furniture-factory is a remarkable place. Mr. Unna is a German, who began the business with six workmen only twelve years ago, but the works now occupies a whole square and employs 200 people. Furniture of the highest quality only is made, and it is all hand-made and hand-carved. The works includes an iron foundry and machine shop, a cabinet shop, including sawing and planing machines, a glass grinding, polishing and silvering shop, weaving machines for weaving braids, a designing and drafting room, and storehouses where are kept in the most perfect order the thousands of things that are necessary to the production of the great variety of artistic furniture turned out by the establishment. The designs are made after a study of albums of engravings and photographs of the best European furniture, both old and new. There is nothing in the works to remind one of an American factory, where quantity and speed of production are the great essentials; it is all essentially German and Mexican.

"The tobacco-factory makes cigars by hand, and cigarettes both by hand and by machinery. A few American cigarette-machines are in use, but the style of cigarette preferred by the Mexicans is made by hand, and machinery has not been adapted for making it. In one room we saw over 400 girls, sitting in rows, each with a large wooden bowl containing the tobacco. The task of each was the rolling of 3200 cigarettes, which was accomplished in 7 or 8 hours, the wages paid being 60 or 70 cents, Mexican, per day. The clean and respectable appearance of these Mexican girls was most noticeable.

"In the evening there was a serenade by the bands of the 15th Infantry and of the Military Industrial School. It was held in the Plaza des Armas, a small park in front of the Palace. Seats were provided for our party, and the whole population of the city seemed to be present, walking around the park in two double rows, one of men, the other of women, or standing in crowds throughout the park and in the surrounding streets. It was especially noticed that the majority of the people wore American dress in all its varieties, only a minority wearing the Mexican sombrero and zerape. Shoes were also worn by nearly all, bare feet and sandals both being much more rare than we have seen in other places.

"At 10 o'clock a grand ball was given in the clubhouse of the *Sociedad Potosina*. The ball-room is one of the finest rooms we have seen in our travels. It is said to be a copy of the ball-room in the Winter Palace in St. Petersburg. The decorations and the general color-effect are exquisite. During the ball a supper was served in the French style, in 13 courses, with French wines. After the ball, the special street-cars returned us to the train; and we left for Tampico at 2 A.M."

## *Tampico.*

Early in the morning of Saturday, November 23d, having passed through the San Ysidro valley in the night, the tourists found themselves at Cardenas, on the way to the port of Tampico. The following description is substantially taken from the *Iron Age* of December 5, 1901:

"Soon after, the train entered the great cañon of the Tamsopo, fringing its one wall in a series of curves and tunnels—a splendid piece of engineering. The steep slopes of the cañon are heavily wooded, the bare cliffs rising on every side. At the mouth of the cañon lie the tropical lowlands. A stop was made to view the charming upper pool of the *El Abra* falls; and towards evening a visit was made to the fantastic *Chov* cave. The train reached *La Barra*, beyond Tampico, in time to permit a stroll along the beach of the Gulf in the moonlight. Extensive jetties have been extended into the sea at the bar, about 6 miles from Tampico, permitting the entrance of ships drawing from 18 to 21 ft. of water.

"Having thus descended in one day from the plateau of Mexico to the tropics, many of the party were up at sunrise on Sunday for a plunge into the breakers, in spite of warnings of the risk of encountering sharks. Later in the day the journey was resumed.

"After the somewhat exciting descent of Saturday, a new experience awaited the party on the Monterrey and Mexican Gulf railway, which extends from Tampico to Monterrey, and beyond. This enterprise has had a checkered career, having been at one time in the control of Belgian capitalists. A few days before the Institute party reached Tampico, the road was transferred to the interests controlling the Mexican Central R. R. In running over a long-neglected roadbed, the heavy Pullman cars swayed ominously, and it was many hours after schedule-time that the trains steamed into the station of Monterrey, where two military bands had long awaited their arrival."

*Monterrey.*

This large town, the industrial center of northern Mexico, was reached on Monday, November 25th. The following description of the excursions and entertainments of that day and the day following, like the passage preceding, is substantially copied from the article in the *Iron Age* of December 5, 1901.

"In the afternoon the party visited the Monterrey plant of the American Smelting and Refining Company, known as Smelter No. 3, which confines its operations to the production of argentiferous base bullion, and the works of the Monterrey Smelting and Refining Company known as Smelter No. 2. The latter, which is controlled entirely by Mexican capital, is equipped not alone for lead smelting, but also for the desilverization of base bullion by a modification of the Parkes zinc process, and for the parting of dore bars by the Moebius process. To the majority of the engineers, however, the most interesting and almost startling development of Monterrey was the large steel plant which is now under construction there. The *Cia. Fundidora de Fierro y Acero de Monterrey, S. A.*, is a concern organized by Mexican and French capital, the principal interest being held by the estate of Patricio Milmo. It has a capital of $15,000,000 (Mexican), of which about 35 per cent has been called in. The layout is exceedingly fine, the consulting engineer being William White, Jr., of Pittsburg.

"In the evening the party attended a ball tendered by the Local Committee at the Juarez theater.

"Tuesday morning, November 26th, a special train carried the party for a visit to the *Diente* gorge, about 15 miles from the city. The mines are located high in the mountains, the tunnels opening at almost inaccessible points on the cliffs. The narrow valley which the railroad reaches is really only the shipping station for two of the mines, the *Diente* and the *Zaragoza* mines. In the case of both there are very interesting installations of wire-rope tramways. The owners of the *Diente* mine, the Mexican Ore Company (an American enterprise), are building an incline. This concern owns also the *San Pedro* and *San Pablo* mines in the district, and employs about 3000 men. The ore is lead-carbonate and galena, carrying about 20 per cent. of lead, but only 3 to 12 ounces of silver, per ton.

"At noon the party assembled at luncheon in the handsomely decorated pavilion of the *Zaragoza* mine. After a welcome from the Governor of the State of Nuevo Leon, the party gave three rousing cheers for Carlos de Landero, of Mexico, a representative of the Institute, who was chiefly instrumental in perfecting the arrangements for the Mexican meeting."

A session was held in the evening, at which several papers were presented (see *Proceedings*); after which three military bands gave a concert in the *Plaza Zaragosa*, followed by a ball at the beautiful Monterrey Casino.

*Las Esperanzas.*

During the night, the trains proceeded to this place, which was reached November 28th, via Baroteran. The mines and

plant of the Mexican Coal and Coke Company, a description of which will be found in the paper of Mr. Edwin Ludlow, read at the Monterrey session, was here inspected.

### *Homeward Bound.*

The journey back to Chicago, via New Orleans, presented no features of special professional interest, except the brief stay of Train No. 2 at Beaumont, Texas, for a hasty glance at the famous new oil-field, and the extraordinary run from New Orleans to Chicago, already mentioned on a former page of this account.

The arrival of the excursion-trains at Chicago on Saturday, November 30th, practically concluded a successful and interesting journey, memorable in the annals of the Institute.

### *Acknowledgments and Presentations.*

Under this head, the following particulars were deemed worthy of record:

1. In recognition of the cordial interest exhibited by Gen. Porfirio Díaz, President of the Republic of Mexico, in the meeting of the Institute, and the effective aid contributed by the various executive departments of the government under his direction, towards the professional profit, as well as the social enjoyment thereof, a complete set of the thirty volumes of the *Transactions*, handsomely bound, was presented to him, by authority of the Council, in the name of the Institute, and acknowledged by him in a personal letter to President Olcott, dated Mexico, Jan. 11, 1902, of which the following is a translation:

MEXICO, Jan. 11, 1902.

"ESTEEMED SIR:

"Referring to your communication of the 30th of December last, I hasten to express my hearty thanks for the courteous gift of the valuable Transactions of the American Institute of Mining Engineers, in thirty volumes. I have placed these important books in the National Library of Engineers, as their most appropriate repository.

"Your most obedient servant,

"PORFIRIO DÍAZ."

2. Silver vases have been presented, in the name of the Institute excursion party, to Señors Carlos F. de Landero and Rafael M. de Arozarena, in recognition of their pre-eminent

labors in the promotion of the Mexican meeting, and in the reception of the visiting members of the Institute.* These vases, shown in the accompanying illustrations, were forwarded through the U. S. Department of State, and courteously allowed by the Mexican government to pass the international boundary free of all customs dues.

3. During the evening of Nov. 29th, on the run from New Orleans to Chicago, similar pleasant and almost simultaneous incidents occurred on each of the two trains.

Upon No. 1, the members of the party quietly gathered in the Observation end of the car "Pacific," and sent a delegation to Mr. Dwight, who was in his state-room; upon whose appearance, two handsome pieces of Creole silver were presented to him in a graceful and humorous speech by Prof. George E. Ladd, as an expression of appreciation of his efforts in looking after the safety and comfort of the party.

Upon No. 2, at the dinner-hour, when all were gathered in the dining-car, Mr. W. E. C. Eustis made a presentation, on behalf of the passengers in this train, of two handsome pieces of Creole silver to Mr. Edward W. Parker, who, as previously remarked, had discharged the laborious work of caring for the safety and comfort of that party.

In both cases the recipients were completely taken by surprise, and could not attempt to reply, or even to express their appreciation, otherwise than by their obvious embarrassment and equally obvious pleasure.

4. About five hundred handsomely engraved official acknowledgments have been transmitted to the various officials, companies and citizens of Mexico, whose hearty co-operation so greatly contributed to the success of the meeting and of the excursions connected therewith.

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* These gentlemen met the Institute party at the border of Mexico, and remained with it, as perpetual guides and counsellors, throughout its entire sojourn within the boundaries of the Republic.

[**This Special Edition is limited to 500 copies.**]