

AREA  
CO  
SanLuis  
Temp

GL03254

OPEN-FILE REPORT NO. 80-12

TEMPERATURE--DEPTH PROFILES  
IN THE SAN LUIS VALLEY AND CANON CITY AREAS, COLORADO

by  
Charles D. Ringrose

UNIVERSITY OF UTAH  
RESEARCH INSTITUTE  
EARTH SCIENCE LAB.

Prepared by the  
COLORADO GEOLOGICAL SURVEY  
in Cooperation with the  
U.S. Dept. of Energy  
Under Contract No. DE-AS07-77-ET28365

COLORADO GEOLOGICAL SURVEY  
DEPARTMENT OF NATURAL RESOURCES  
STATE OF COLORADO  
DENVER, COLORADO

1980

TEMPERATURE--DEPTH PROFILES  
IN THE SAN LUIS VALLEY AND CANON CITY AREAS, COLORADO

by  
Charles D. Ringrose

Prepared by the  
COLORADO GEOLOGICAL SURVEY  
in Cooperation with the  
U.S. Dept. of Energy  
Under Contract No. DE-AS07-77-ET28365

COLORADO GEOLOGICAL SURVEY  
DEPARTMENT OF NATURAL RESOURCES  
STATE OF COLORADO  
DENVER, COLORADO

1980

## NOTICE

This report was prepared to document work sponsored by the United States Government. Neither the United States nor its agent, the United States Department of Energy, nor any Federal Employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represents that its use would infringe privately owned rights.

## NOTICE

Reference to a company product name does not imply approval or recommendation of the product by the Colorado Geological Survey or the U.S. Department of Energy to the exclusion of others that may be suitable.

TEMPERATURE - DEPTH PROFILES  
IN THE SAN LUIS VALLEY AND CANON CITY AREAS

Introduction

The Colorado Geological Survey has on going investigations of various low temperature geothermal reservoirs within the State of Colorado in order to assess the geothermal potential of the state. Funding for this investigation is supplied by the U.S. Department of Geothermal Energy through the State Coupled Program, Contract No. DE-AS07-77ET-28365.

This report makes available to the public temperature-depth profiles measured in the San Luis Valley and Canon City areas during June, 1980. This is only part of the information collected to evaluate the potential geothermal resources of the areas.

Maps (Figure 1 and Figure 2) of the areas show approximate locations of each thermal gradient hole. All gradient holes were approximately 100 m deep except for hole C-7 in the Canon City area which was about 520 m deep.

Drilling Method

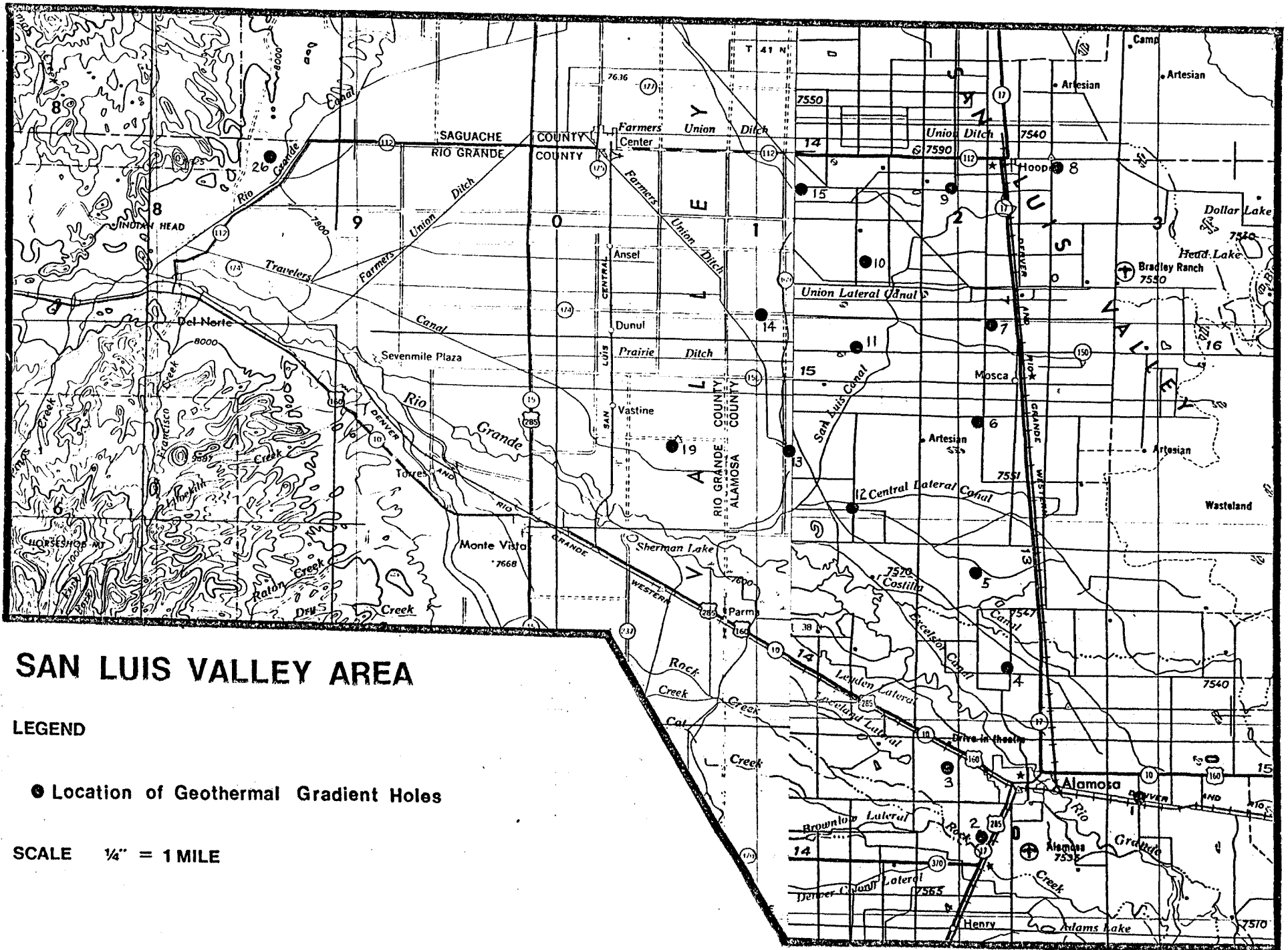
All the thermal gradient holes in the San Luis Valley were rotary drilled with a bentonite mud or air-mist and grouted from top to bottom by pumping through the 2" black iron pipe casing. The drilling was finished on December 14, 1979.

The Canon City thermal gradient holes were rotary drilled with air and air-foam and not grouted. As in the San Luis Valley, the casing was 2" black iron pipe. The drilling was finished on January 23, 1980.

Data

To expedite the temperature logging, all geothermal gradient holes were filled with water. It appeared that in many holes there was hydraulic leakage through the joints in the casing to the surrounding strata. This was apparent because of the change in water level between the time of filling casing with water after drilling completion and the time of temperature logging.

The temperature measuring instrumentation used for all 100 m holes was calibrated to an accuracy of  $\pm .1^{\circ}\text{C}$  and with a resolution of at least  $.01^{\circ}\text{C}$ . The 520 m hole in Canon City was logged by the Department of Geology, University of Wyoming, under supervision of E. R. Decker on 4/24/80. The logging of the 100 m holes in Canon City was done between 6/5/80 and 6/26/80. And the logging in the San Luis Valley was done between 6/25/80 and 6/26/80. The plots of temperatures and depths of the San Luis Valley gradient holes are shown in Figures 3 to 18 and the plots of temperatures and depths of the Canon City gradient holes are shown in Figures 19 to 29. Tables 1 and 2 give the average gradients (from 30m to bottom of hole) for the San Luis Valley and Canon City, respectively.



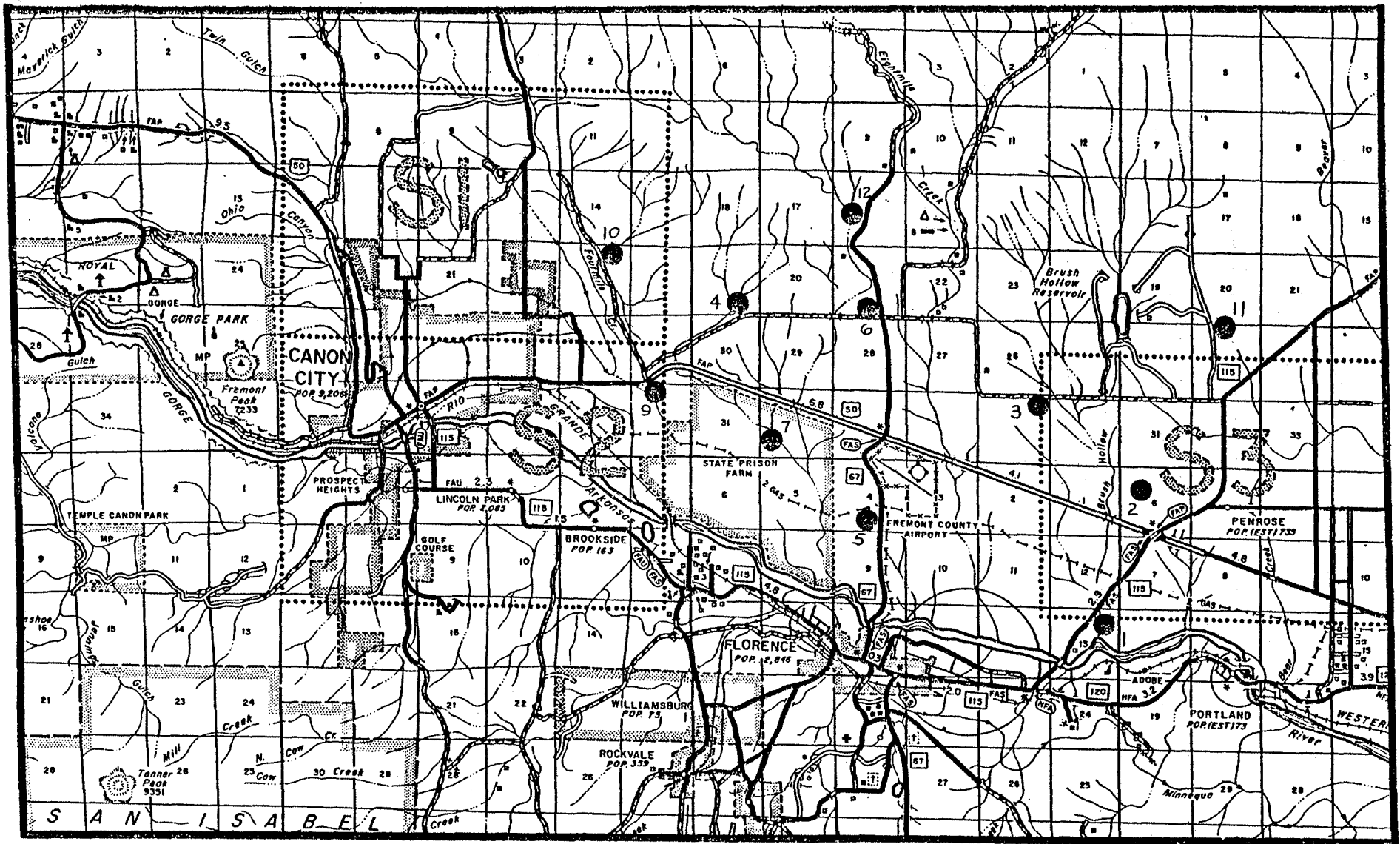
# SAN LUIS VALLEY AREA

## LEGEND

● Location of Geothermal Gradient Holes

SCALE 1/4" = 1 MILE

FIG. 1



# Cañon City Area

SCALE  $\frac{1}{2}$ " = 1 MILE

## LEGEND

● Location of Geothermal Gradient Holes

FIG. 2

TABLE 1

Average <sup>1</sup> Gradients for San Luis Valley Geothermal Gradient Holes

<u>Hole</u>	<u>Average Gradient (°C/km)</u>
1	64.9
2	58.3
3	48.7
4	60.4
5	52.9
6	61.8
7	74.7
8	58.1
9	55.3
10	70.3
11	50.6
12	68.6
13	55.4
14	43.5
19	29.6
26	71.5

TABLE 2

Average <sup>1</sup> Gradients for Canon Ciy Geothermal Gradient Holes

<u>Hole</u>	<u>Average Gradient (°C/km)</u>
1	89.7
2	69.0
3	55.6
4	38.9
5	21.8
6	30.2
7	34.3
9	45.0
10	41.5
11	45.2
12	28.2

<sup>1</sup> Average calculated by using bottom hole temperature and temperature at 30 m.

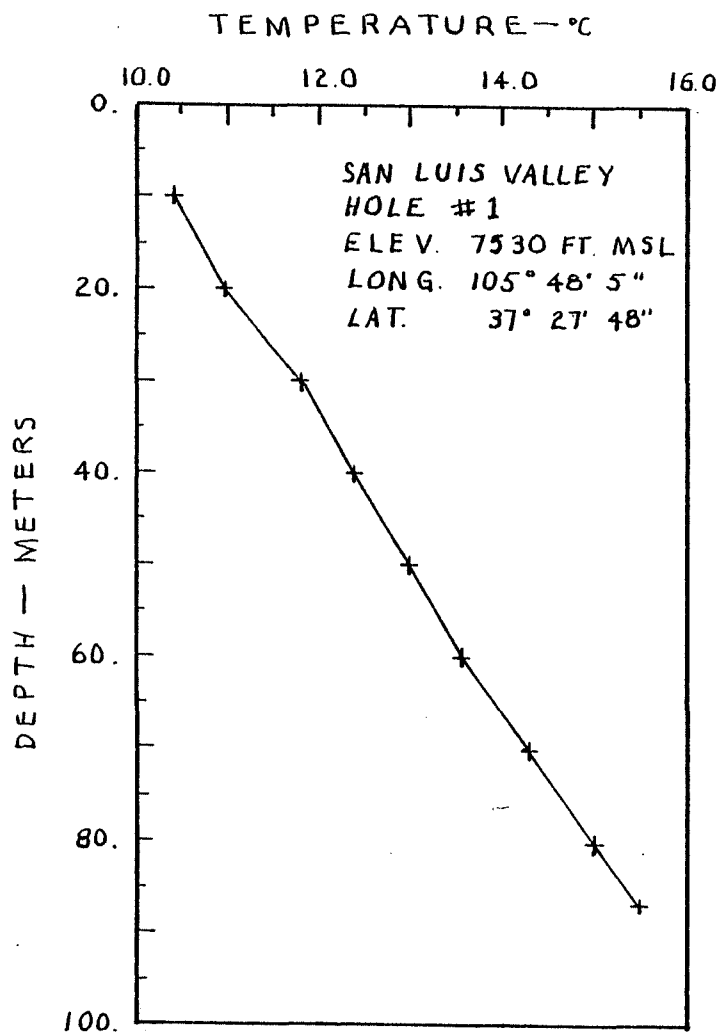


FIG. 3

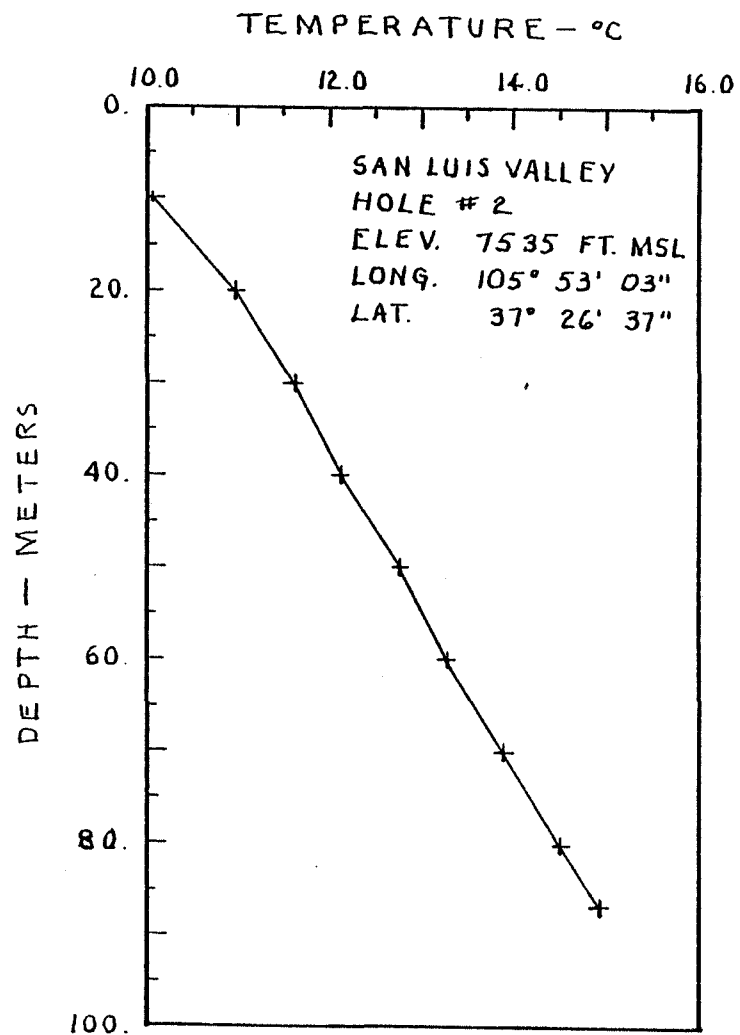


FIG. 4



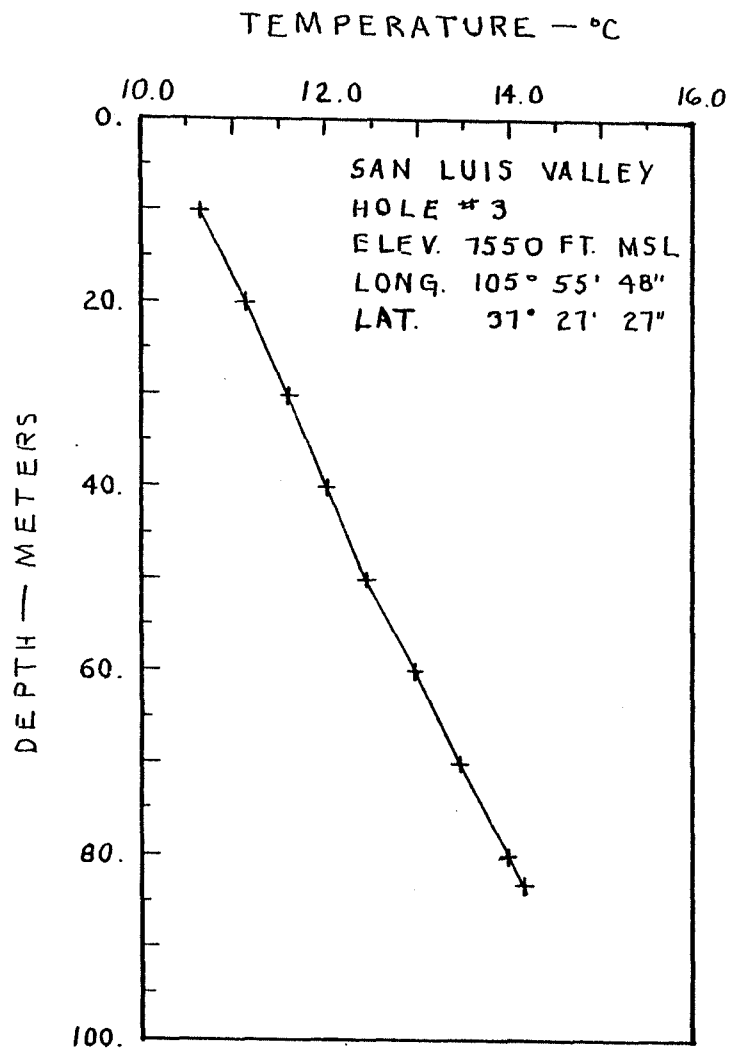


FIG. 5

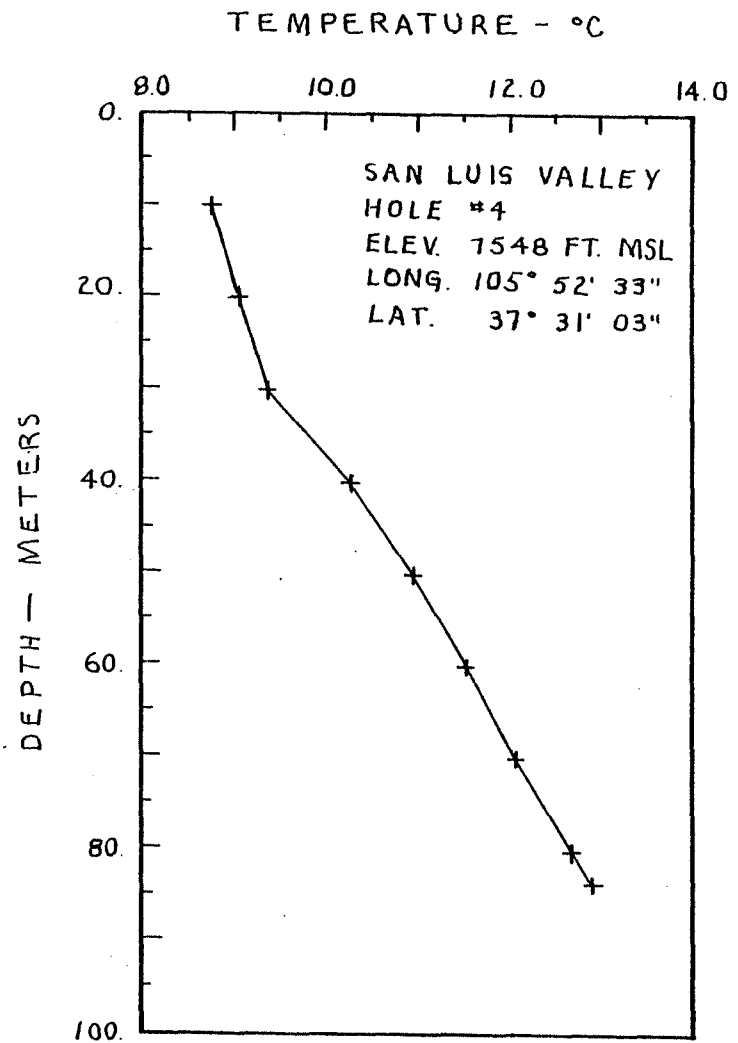


FIG. 6

TEMPERATURE - °C

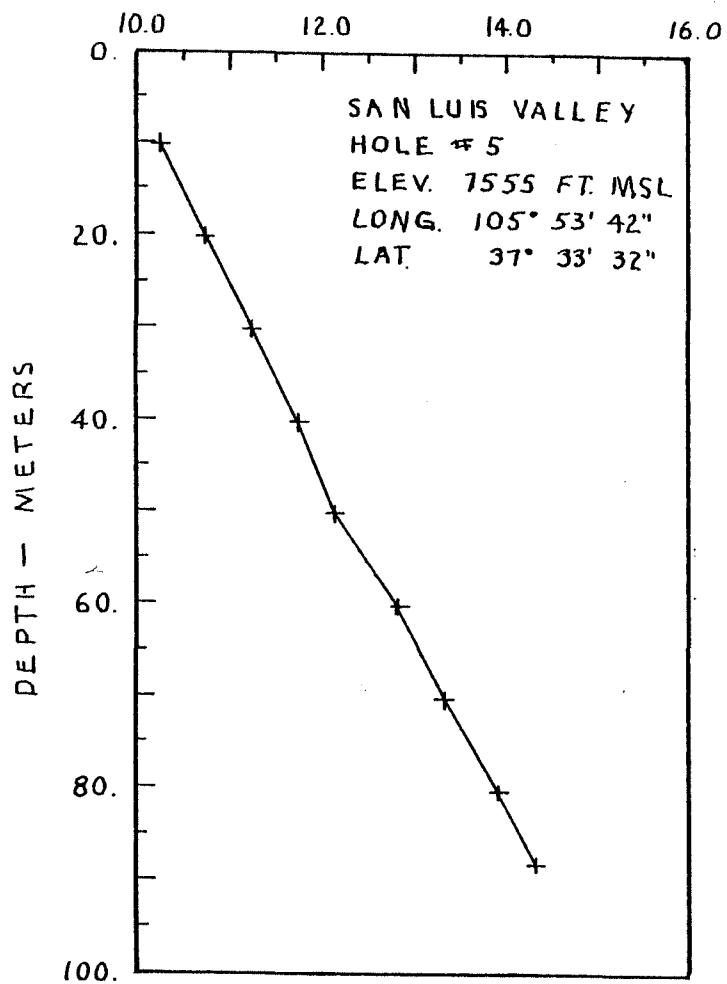


FIG. 7

TEMPERATURE - °C

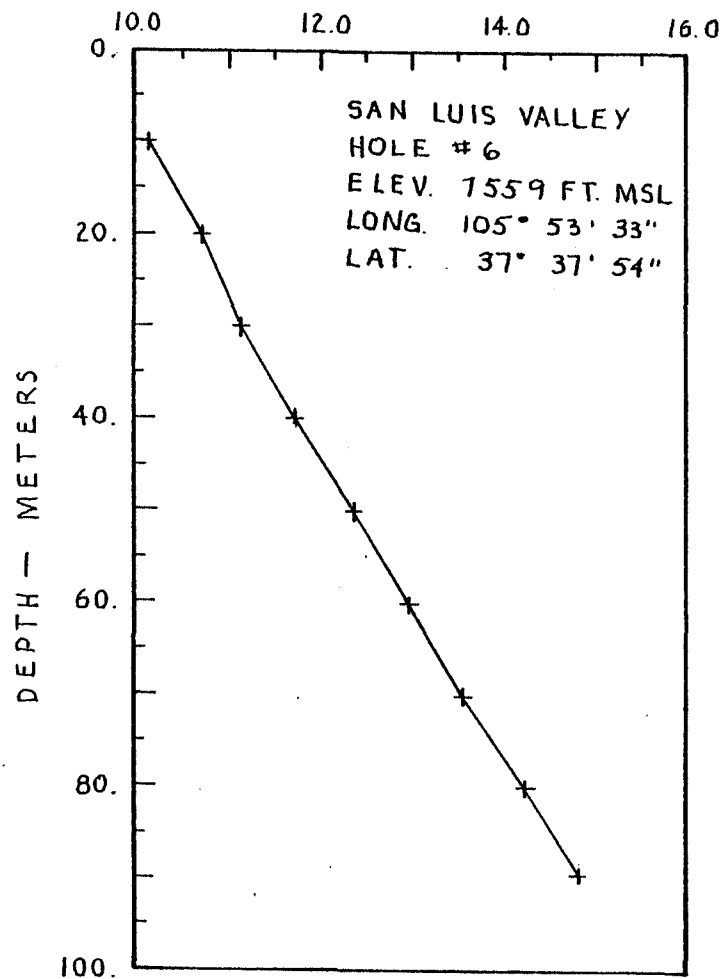


FIG. 8

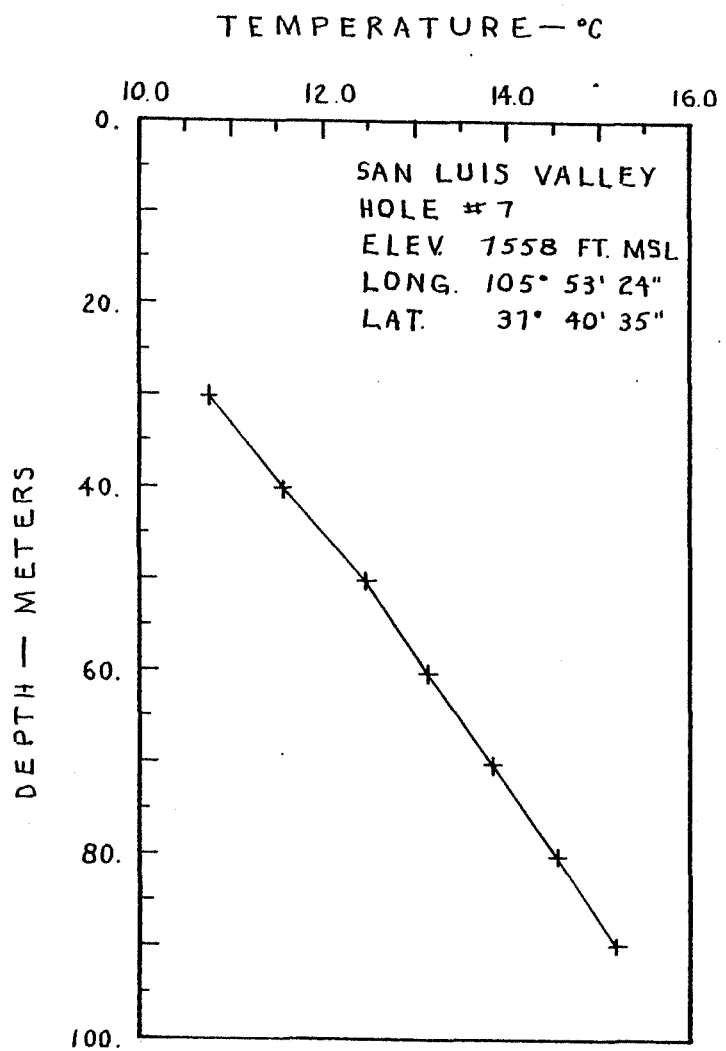


FIG. 9

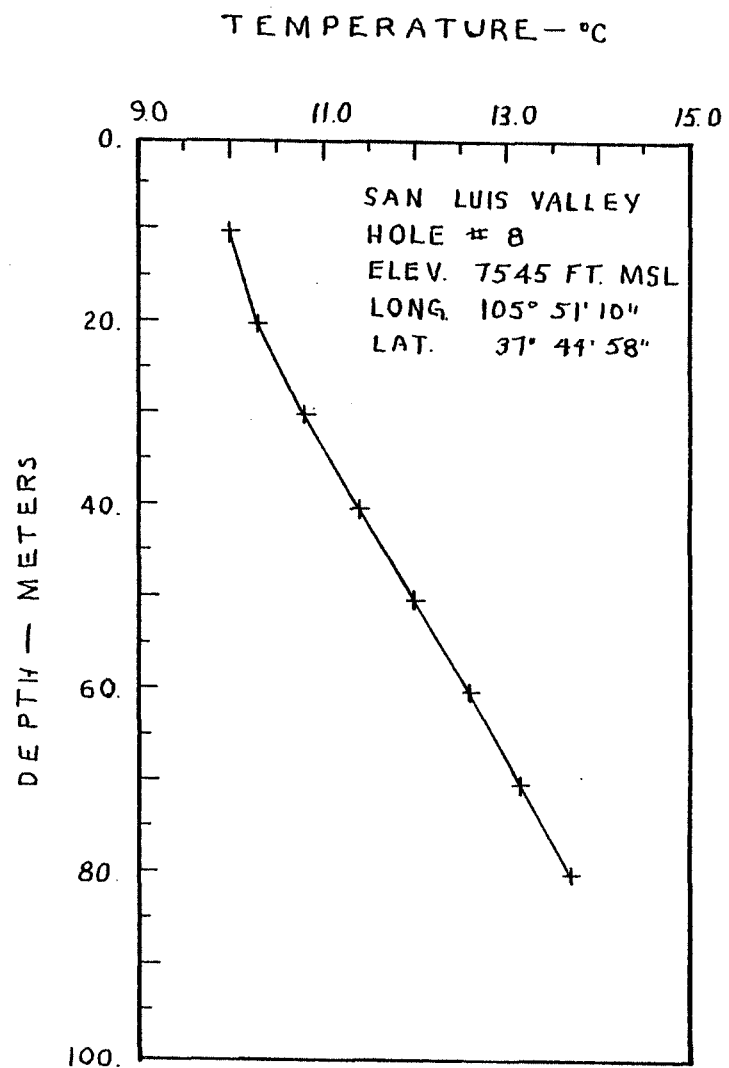


FIG. 10

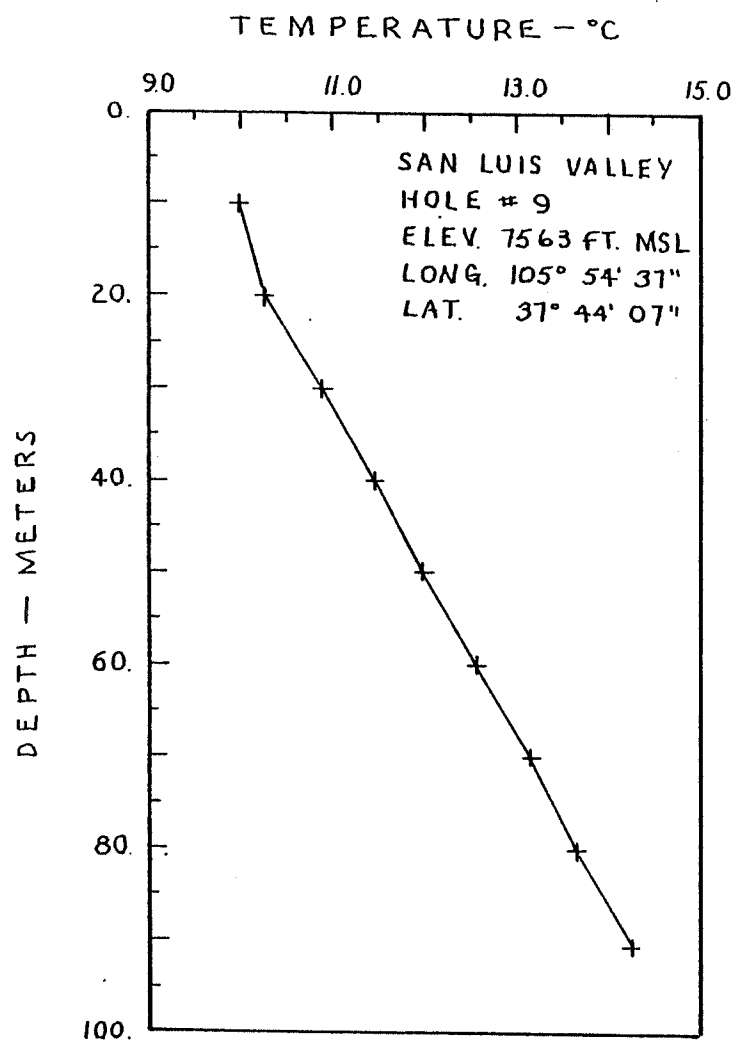


FIG. 11

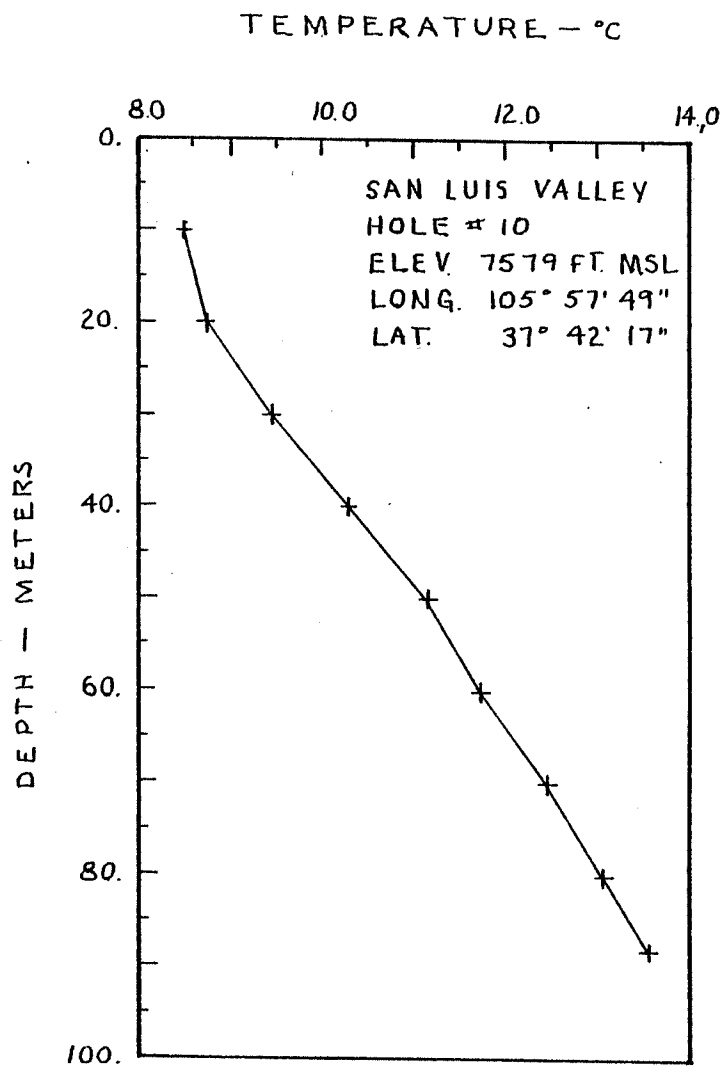


FIG. 12

TEMPERATURE - °C

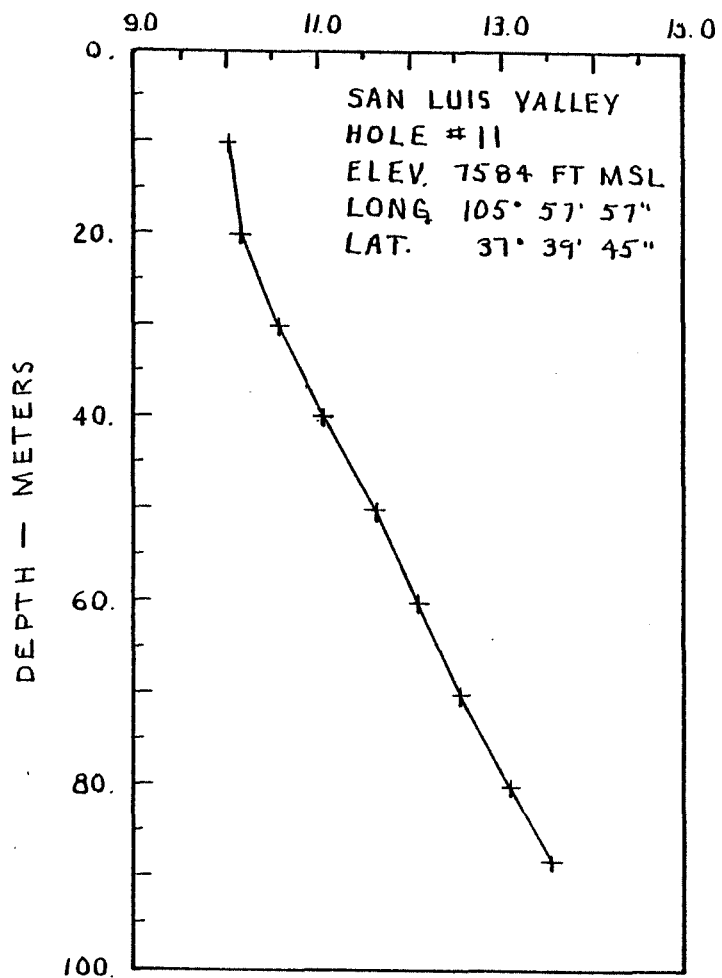


FIG. 13

TEMPERATURE - °C

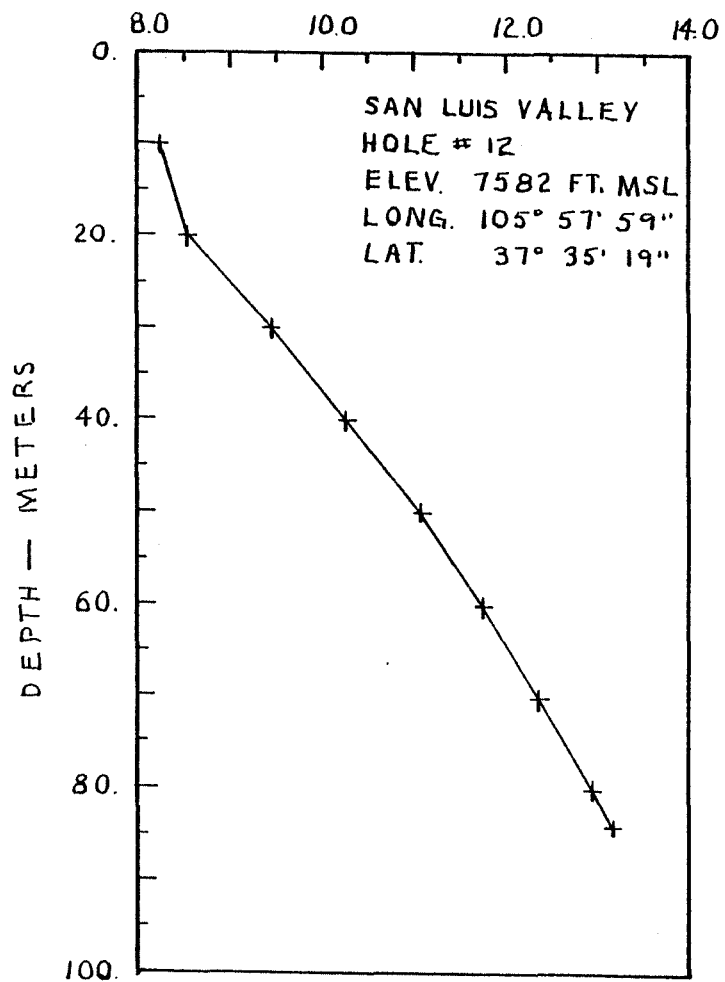


FIG. 14

TEMPERATURE — °C

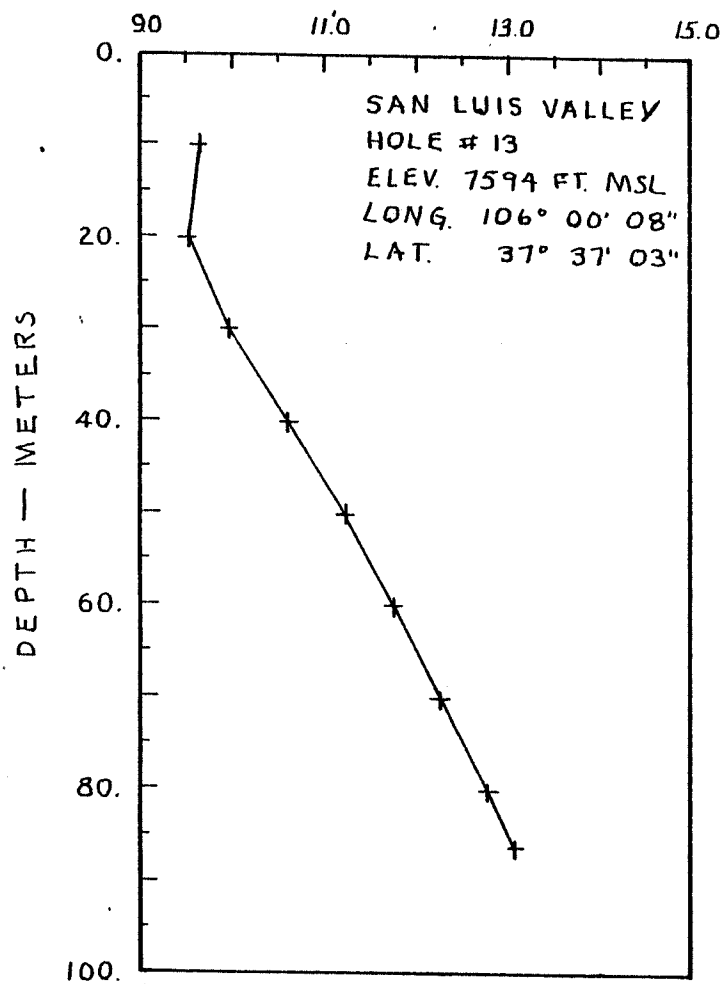


FIG. 15

TEMPERATURE — °C

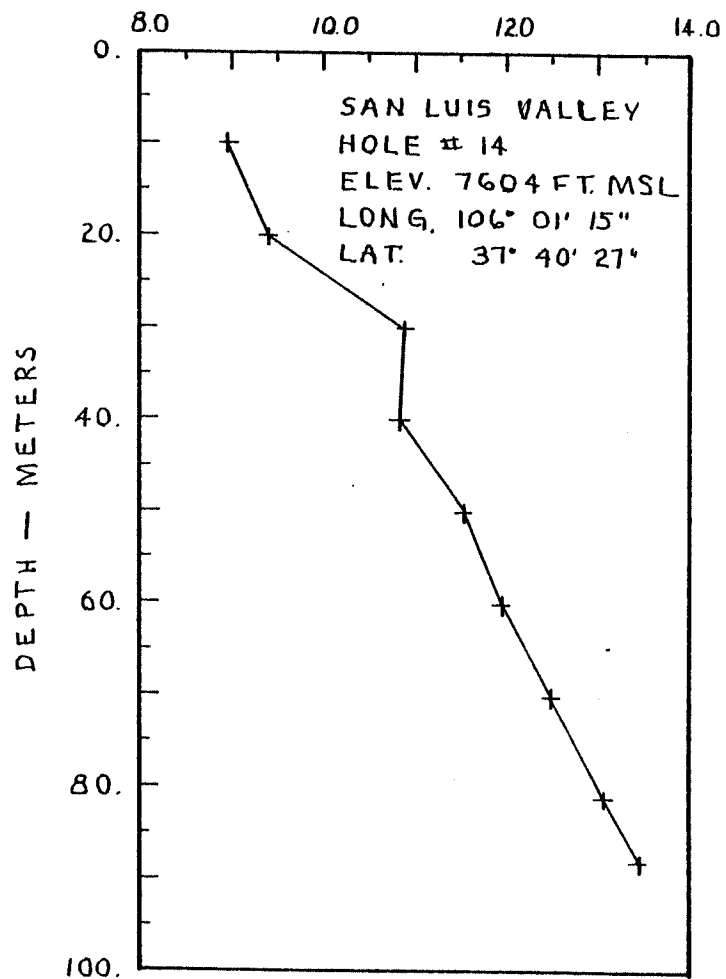


FIG. 16

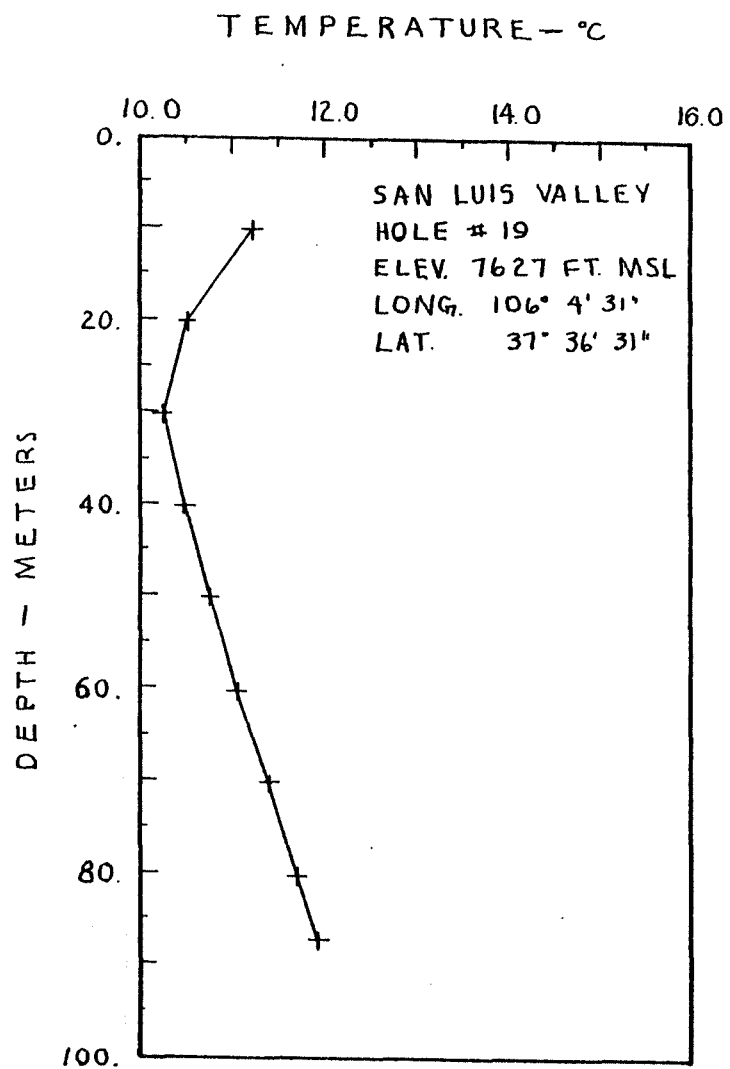


FIG. 17

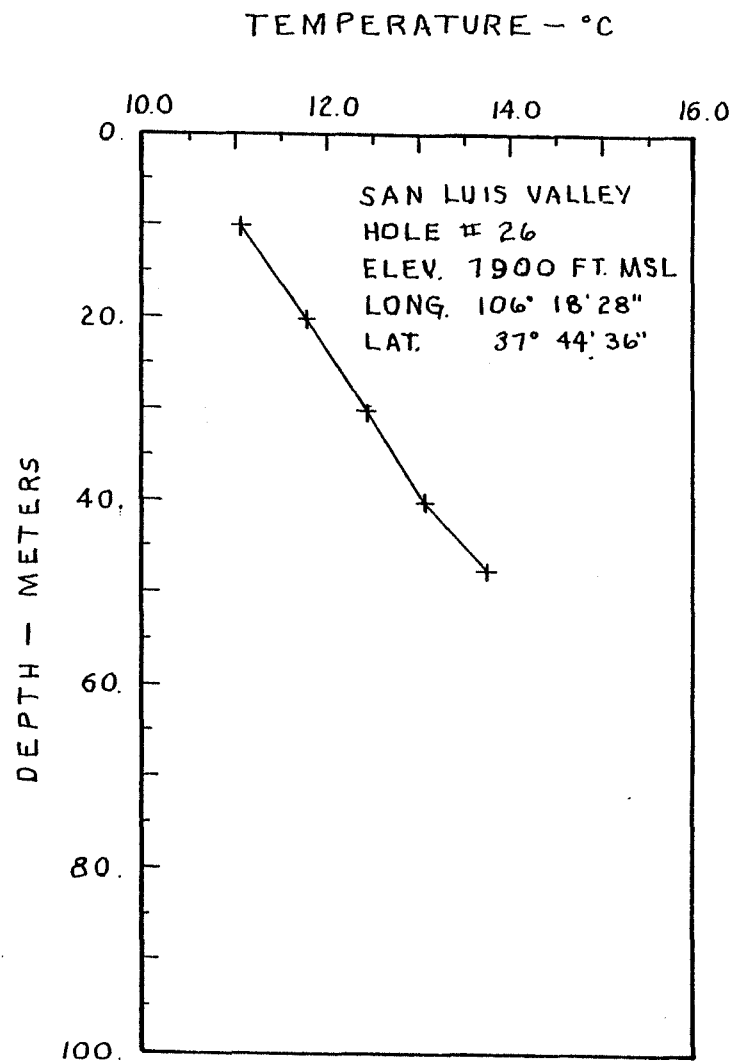


FIG. 18

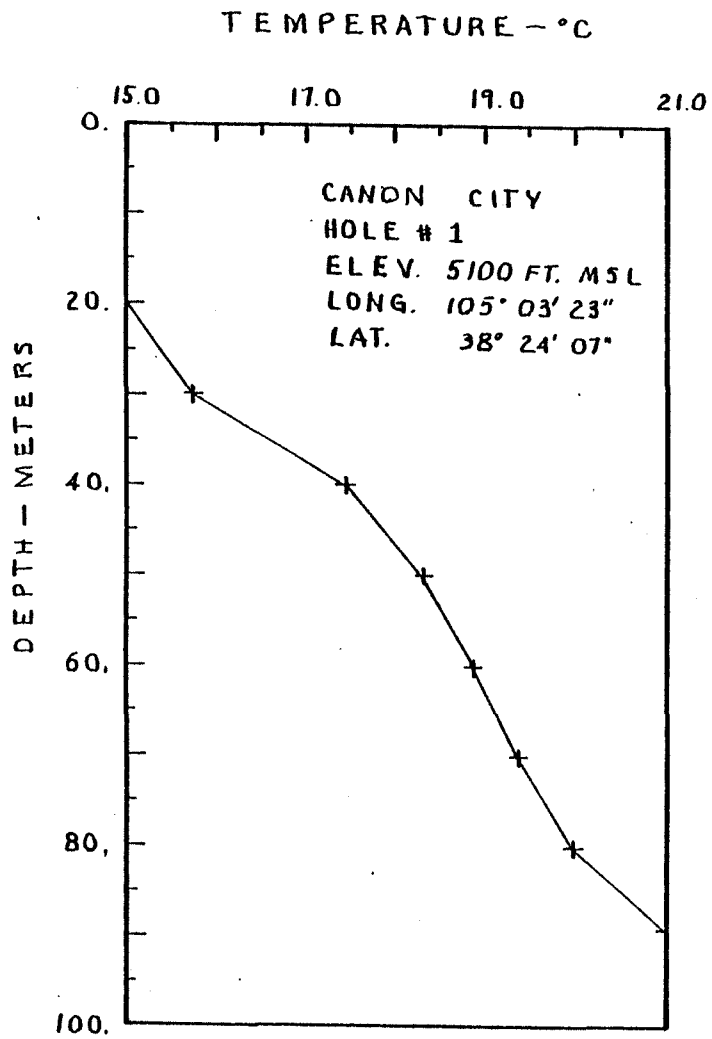


FIG. 19

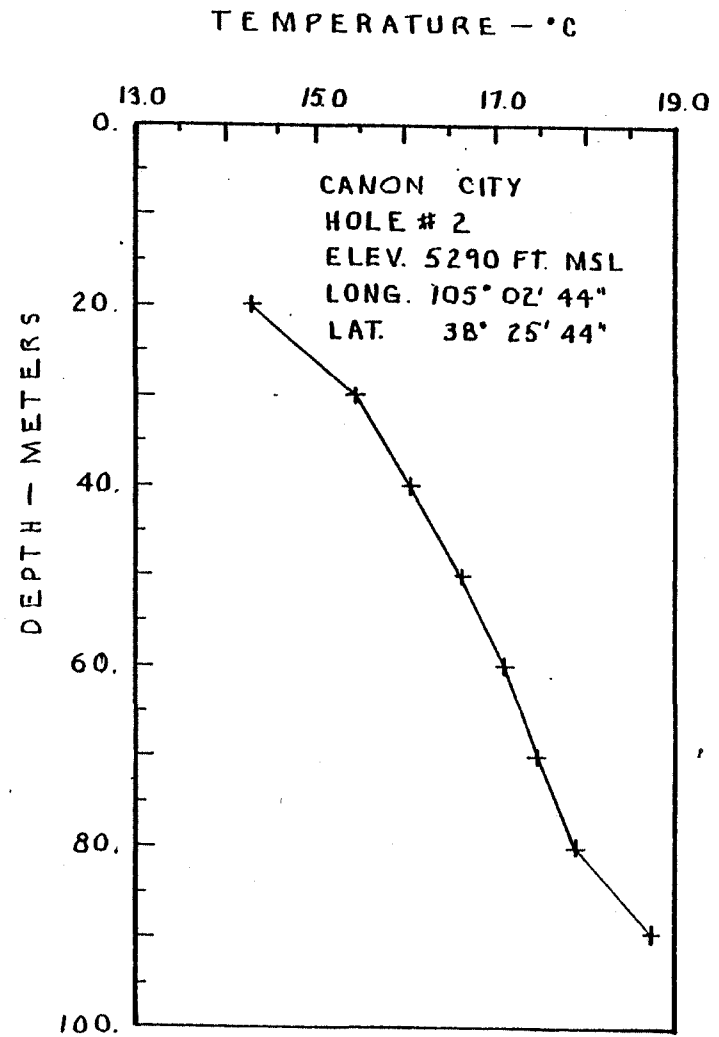


FIG. 20



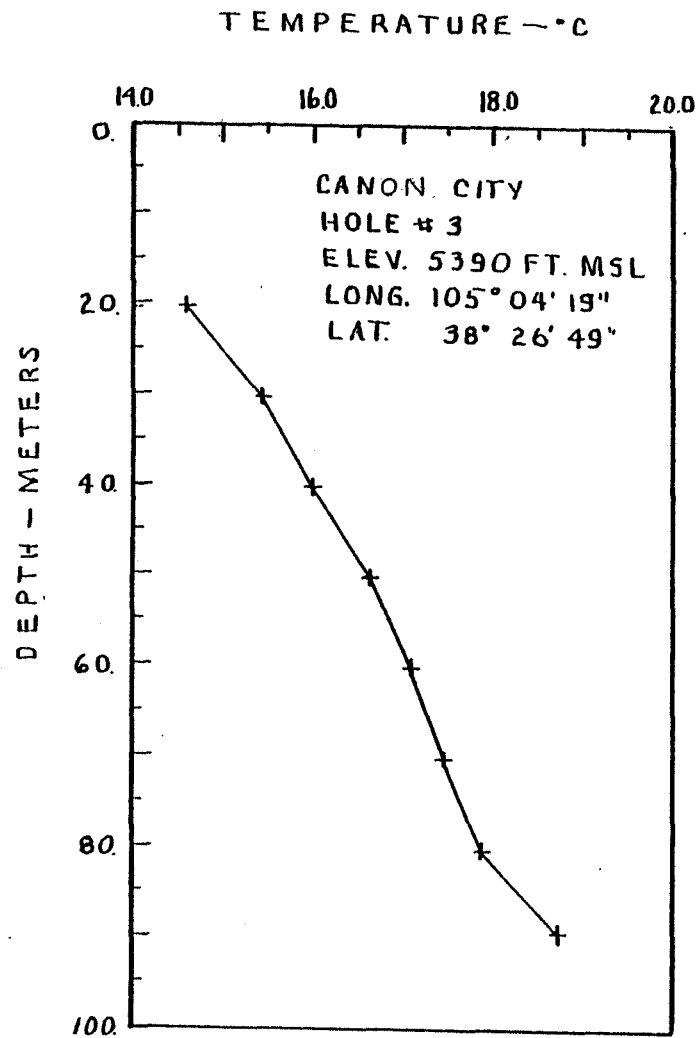


FIG. 21

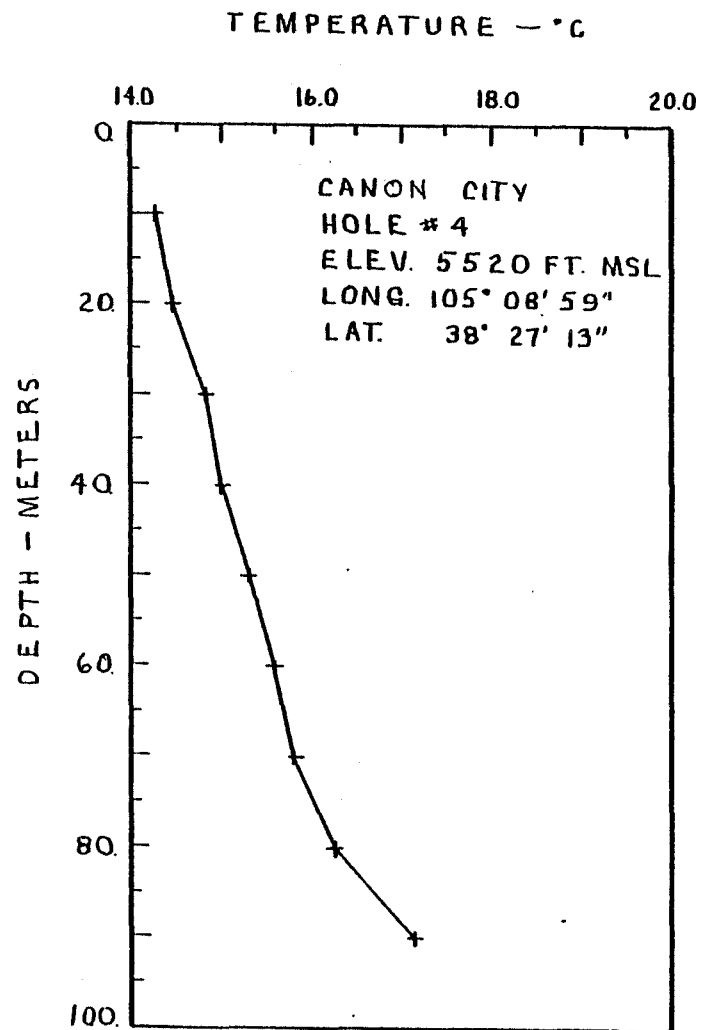


FIG. 22

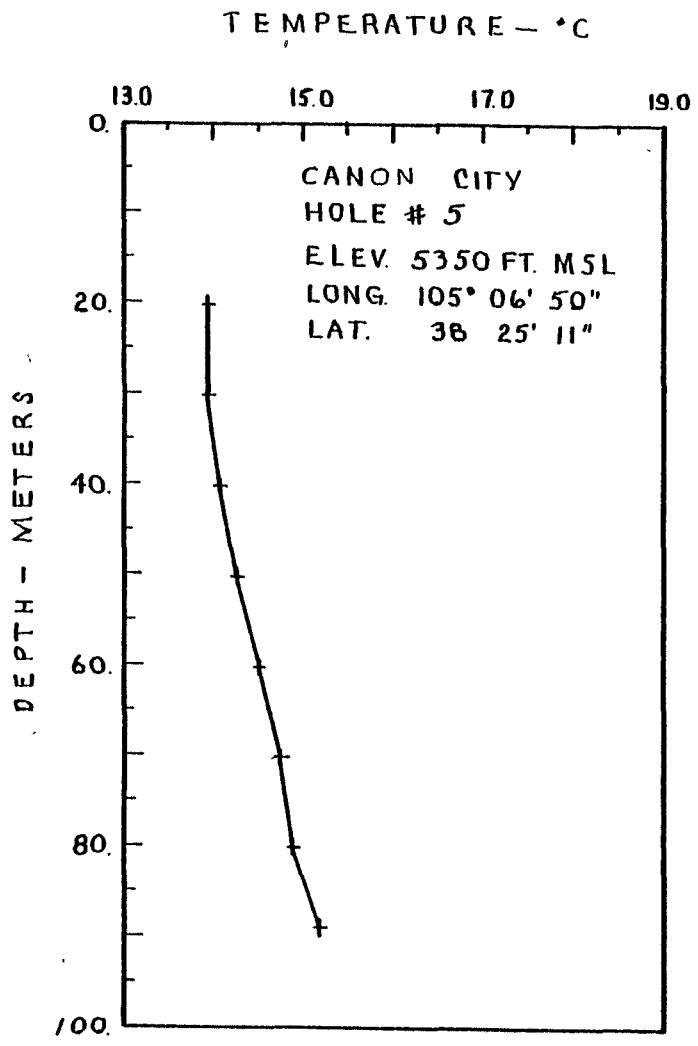


FIG. 23

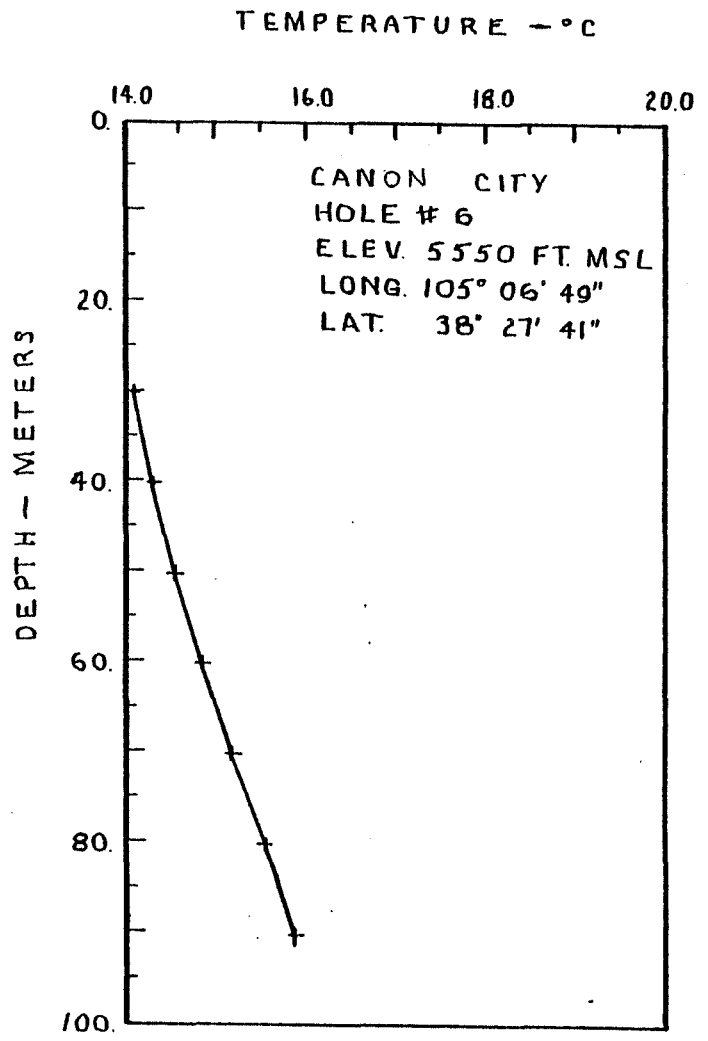


FIG. 24

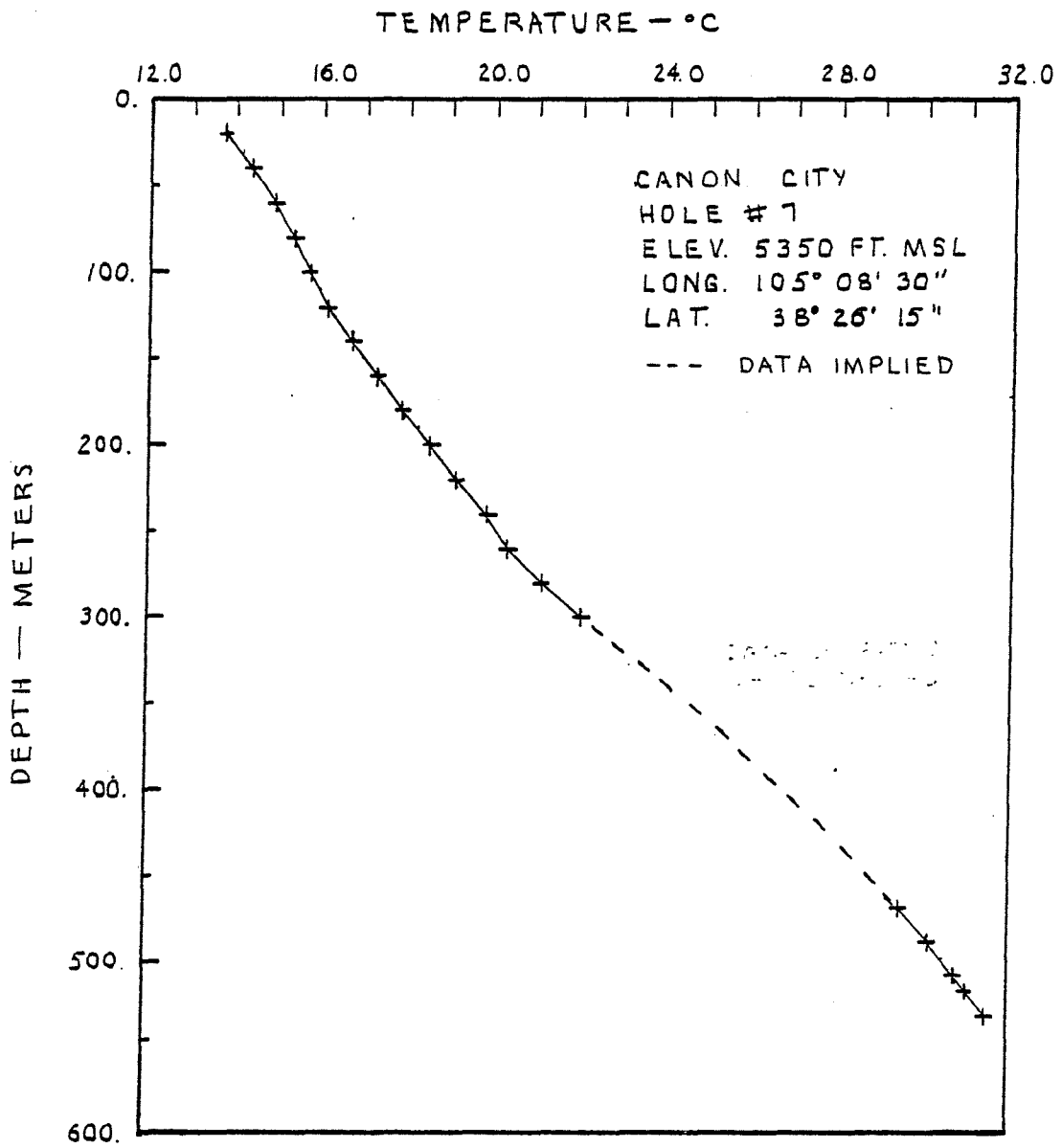


FIG. 25

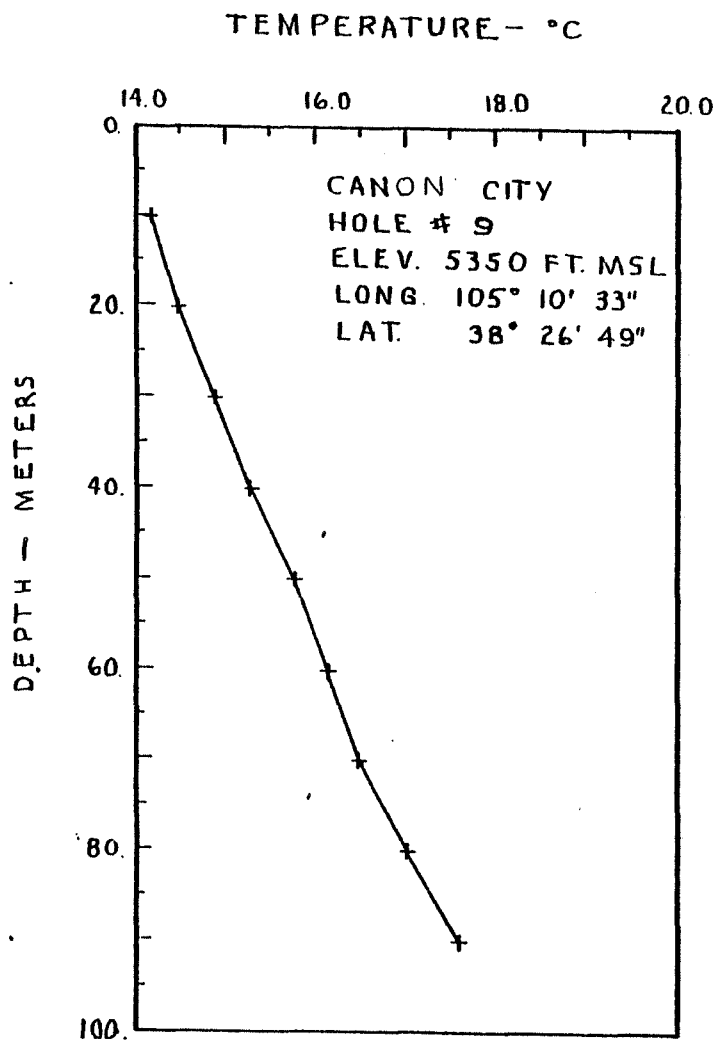


FIG. 26

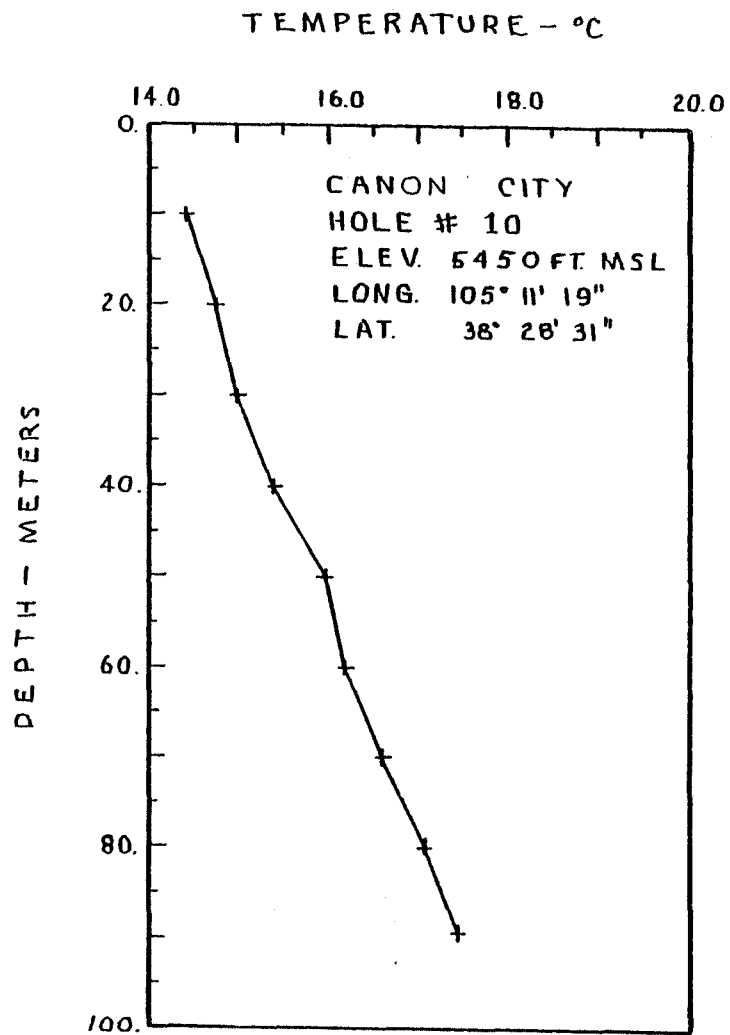


FIG. 27

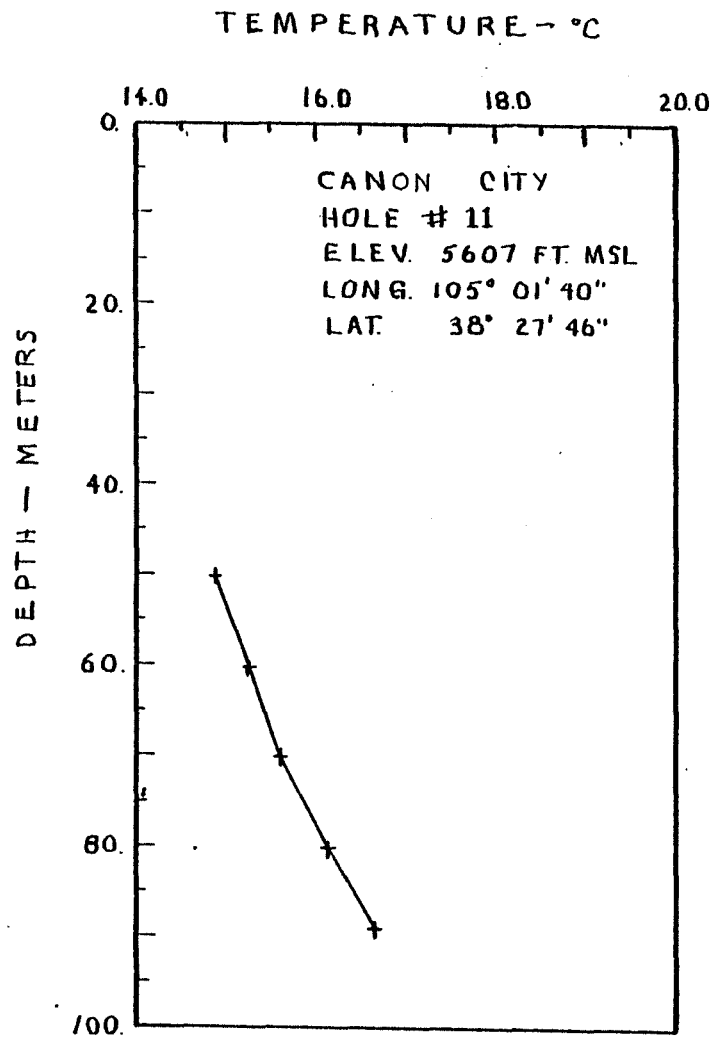


FIG. 28

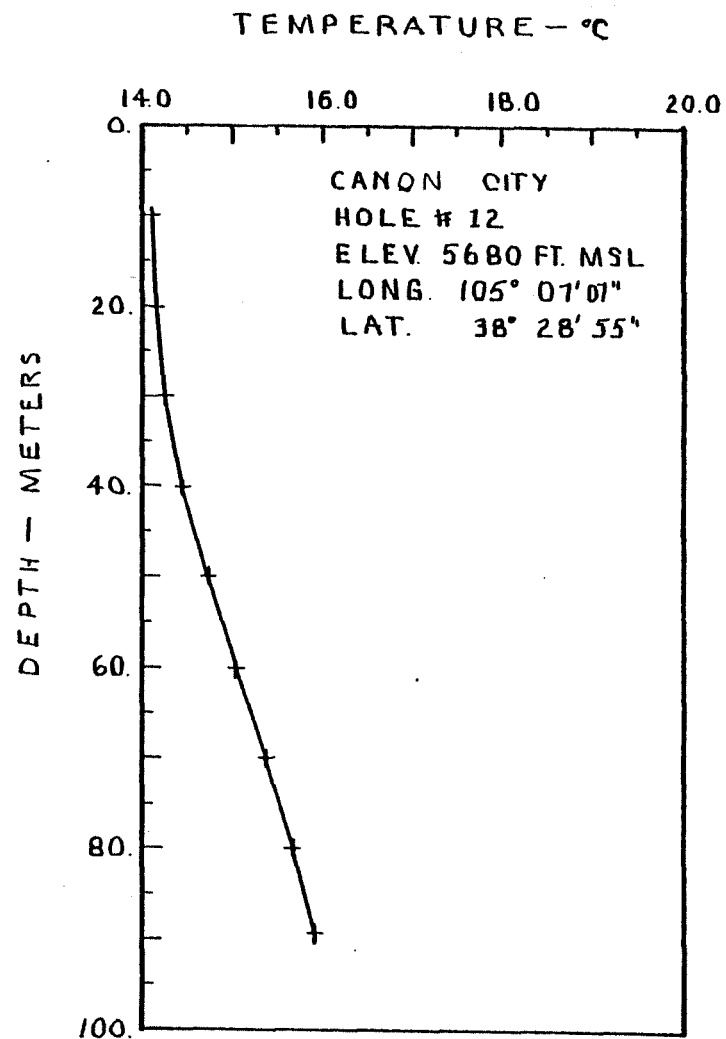


FIG. 29

