

CLAIR A. HILL & ASSOCIATES

CONSULTING ENGINEERS

P.O. BOX 558 — REDDING, CALIFORNIA - 96002

Norm Brazelton

REDDING OFFICE

1525 COURT STREET
REDDING, CALIFORNIA
916-243-5831

SACRAMENTO AREA OFFICE

420 EAST BIDWELL STREET
FOLSOM, CALIFORNIA-95630
916-985-4375

FRESNO AREA OFFICE

618 NORTH PALM AVENUE
FRESNO, CALIFORNIA-93728
209-237-0663

Clair A. Hill & Associates specialize in the general fields of Civil Engineering, Land Surveying, Mapping, and (through an associate firm) Foundation Engineering and the operation of a testing laboratory. In general, the range of operations extends over the Western States and Alaska.

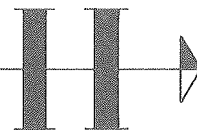
Mr. Hill has maintained an engineering office in Redding since June of 1938, except for about five years when serving in the Army during World War II. Since reopening the office in December 1946, the organization has grown rapidly to its present average strength of 140 employees; which assures the client of an adequate staff for engineering services as needed.

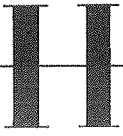
The engineering staff is made up of engineers with widely diversified experience. This versatility is most important to the accomplishment of complete engineering services for a wide variety of projects.

Equipment plays a vital part in the widespread operations. Close liaison is maintained by the use of five company-owned airplanes and industrial radio. A fleet of fifty vehicles and twelve trailers provides for economic housing and servicing of field personnel, even in remote areas. Survey and mapping operations employ the most modern optical and electronic equipment.

Reports, plans, specifications, and other engineering work are prepared in the home or branch office. When feasible, a base of operations is established at the project site for project management, survey work, and resident supervision of construction.

It is the attempt of this firm to obtain maximum economy by the most efficient methods of operation and equipment. Complete engineering and surveying services under a single organization can best assure this result.





The staff of Clair A. Hill & Associates is organized to provide complete engineering services for a wide variety of projects. The preliminary phase of a typical project will include some or all of the following: investigations and reports, feasibility studies, special project research, foundation investigations, land surveying, photogrammetric mapping, site planning, and preliminary design with cost estimates. This initial phase will then be followed by the design phase in which final design plans and specifications and other contract documents will be carefully prepared. Then the firm will assist with the taking of bids, the award of contracts, and scheduling of construction. The final phase will be the supervision of construction; including construction surveying, laboratory testing of soils and construction materials, checking of shop drawings, inspection of the work, and checking of contractor's requests for payments.

INVESTIGATIONS & REPORTS

STRUCTURAL ENGINEERING

Buildings
Foundation & Other Structures

FOUNDATION ENGINEERING

Testing Laboratory
Soils Exploration

HIGHWAY & BRIDGE ENGINEERING

Bridges
Streets & Highways
Mountain & Forest Roads

SANITARY ENGINEERING

Water Supply & Distribution
Sewage Collection & Treatment
Storm Drainage

LAND DEVELOPMENT

City & Regional
Industrial Parks & Shopping Centers
Recreational Facilities & Subdivision

WATER RESOURCES ENGINEERING

Water Rights
Dams & Reservoirs
Hydroelectric Power
Flood Control
Irrigation & Drainage
Groundwater

SURVEYING & MAPPING

Land Surveying
Construction Surveying
Planimetric & Topographic Mapping

PHOTOGRAMMETRY

Photo Interpretation
Photogrammetric Mapping
Agricultural Crop Mapping

STRUCTURAL & CIVIL ENGINEERS

Clair A. Hill
John A. Jensen
Robert U. Braithwaite
Grant A. Engstrom

LAND SURVEYORS

James E. Lonngberg
Edwin B. Word

LAND PLANNER

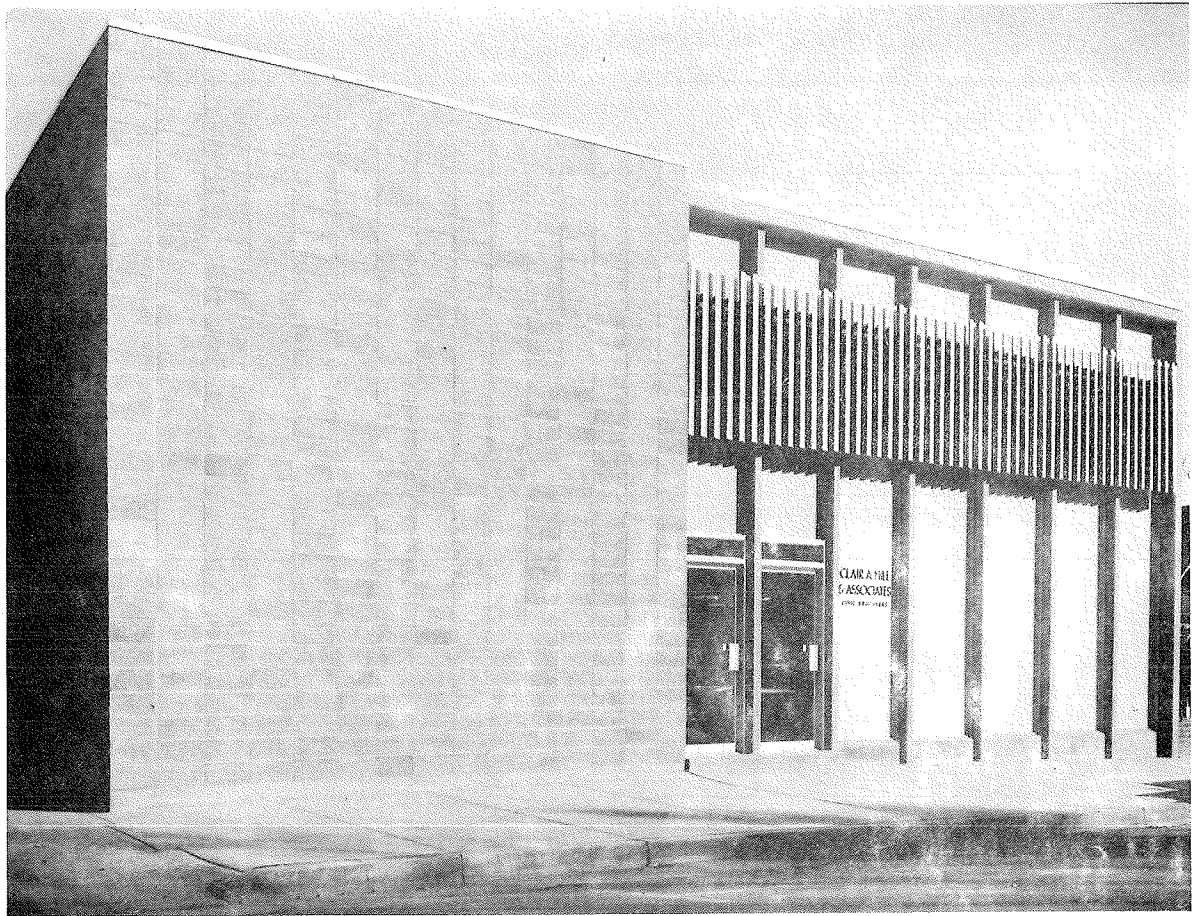
Robert R. Chatfield

CIVIL ENGINEERS

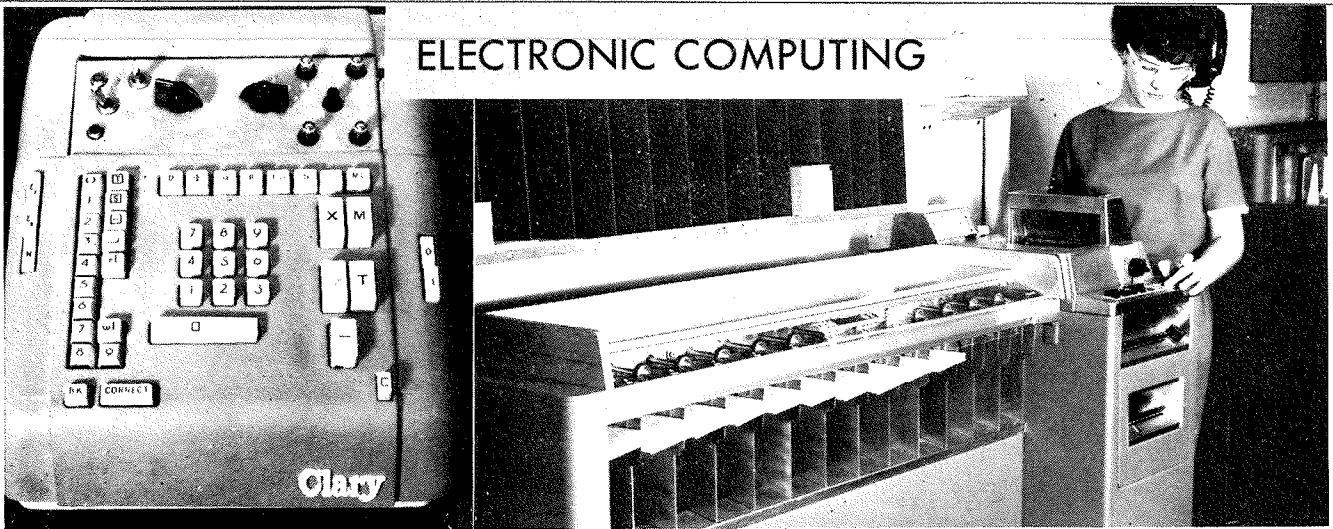
Harlan E. Moyer
Charles L. Hornbeck
Joseph E. Patten
Philip A. Mather (New York)
William T. O'Leary
Donald G. Showalter
Melvin P. Landis
Norman D. Brazelton
Neal P. Dixon
Donald P. Ponke
Robert A. Sondag
Robert J. Wier

PHOTOGRAMMETRIST

Donald R. Mayer



ELECTRONIC COMPUTING



SURVEY CAMP

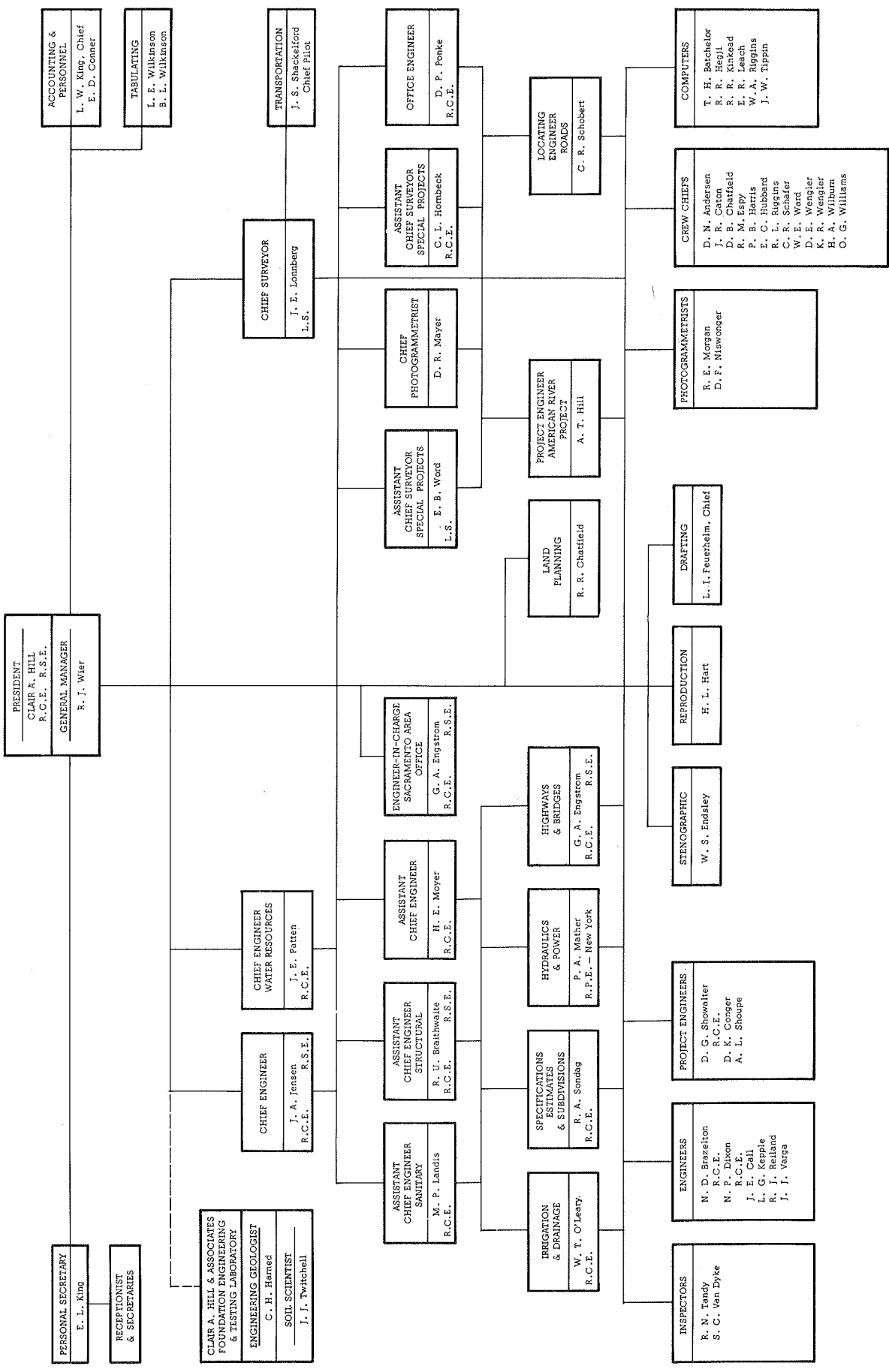


TRANSPORTATION





**CLAIR A. HILL & ASSOCIATES
CONSULTING ENGINEERS**





Clay A. Bell

PROFESSIONAL RECORD

Extensive experience in the general field of civil engineering since 1934. All but nine years of this in the private practice of civil engineering, surveying, and mapping.

Projects described in more detail elsewhere in this brochure include many investigations and reports, building structures, bridges, sewer and water systems, sewage disposal and water supply plants, water resource developments, irrigation and drainage projects, land planning and engineering, highways, land and route surveying projects, mapping, and foundation engineering.

Following design experience with the Standard Oil Company of California and construction experience with the California State Division of Highways Bridge Department, a private practice of engineering was started in Redding in 1938. This was interrupted by five years of service with the U. S. Army on construction work at Benicia Arsenal and as Ordinance officer in Alaska and the Aleutian Islands.

As a member of the American Society of Civil Engineers, participated in the organization of the Shasta Branch and served as its President in 1953; also served as President of the Sacramento Section in 1960.

Appointed a member of the State Board of Registration for Civil and Professional Engineers by the Governor and served from 1958 to 1961. A member of the California Water Commission for nine years, with three years as Chairman. As Chairman of the Commission, represented California before Congressional Committees in Washington, D. C., on matters concerning water development and flood control.

Currently serves as a member of the University of California Water Resources Advisory Council; a member of the California State Chamber of Commerce Water Committee; Chairman of the Water Resources Committee for the Redding Chamber of Commerce. Former President of the Western Association of Engineers and Land Surveyors, and served as a Director for 10 years. Presently a Director and Treasurer of the California Council of Civil Engineers and Land Surveyors.

EDUCATION & REGISTRATION

Oregon State College, School of Forestry
Stanford University
A.B., Civil Engineering, 1932
Engineer, Civil Engineering, 1934
Registered Civil Engineer
California
Registered Structural Engineer
California
Registered Professional Engineer
Alaska, Colorado, Michigan, Nevada,
Oregon, Texas, Utah, Virginia, and
Washington
Certificate of Qualification
National Bureau of Engineering
Registration

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
American Concrete Institute
American Congress on Surveying and Mapping
American Society of Photogrammetry
California Council of Civil Engineers and
Land Surveyors
California Sewage and Industrial Wastes
Association
National Society of Professional Engineers
Structural Engineers Association of Central
California

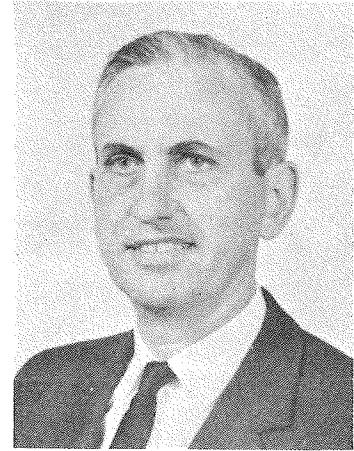


ROBERT J. WIER

General Manager

EDUCATION AND REGISTRATION

University of Missouri – B.S., Civil Engineering, 1933
M.S., Civil Engineering, 1934
Certificate of Qualification – National Bureau of
Engineering Registration
Registered Civil Engineer – California
Registered Structural Engineer – Illinois
Registered Professional Engineer – Illinois and Missouri



PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
Tau Beta Pi

PROFESSIONAL RECORD

Experience in the fields of engineering, construction, surveying, and business since 1934. Over six years of this as a principal in a firm of engineers and architects. General Manager since 1962.

Batthey and Childs, Inc., of Chicago, 1946 to 1962. Project-Engineer, Partner and Vice-President of firm engaged in planning, design and construction supervision for various kinds of industrial plants, with all related facilities, including: food processing, chemical, manufacturing, paper processing, printing, railroad shops, bus terminals, and power plants. Consultant to the Staff of the Illinois Commerce Commission from 1959 to 1962 on numerous rate and service cases for electric power, telephone, and water utility companies.

U. S. Army, 1941 to 1946. Construction officer with Corps of Engineers supervising design and construction of Ordnance Plant, General Hospital, Air Depot, Air Base, and "Atomic Bomb" project.

Between 1934 and 1941, two years of business experience followed by five years in surveying and construction.

JAMES E. LONNBERG

Chief Surveyor

EDUCATION AND REGISTRATION

International Correspondence Schools – Civil Engineering
Licensed Land Surveyor – California
Licensed U. S. Mineral Surveyor

PROFESSIONAL AFFILIATIONS

American Congress of Surveying and Mapping

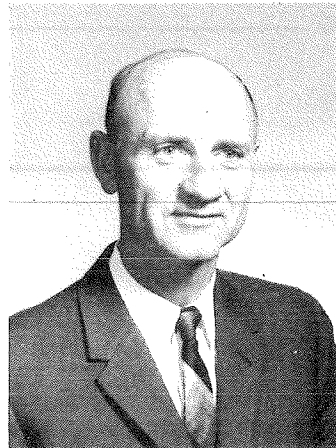
PROFESSIONAL RECORD

Extensive experience in the field of surveying and mapping since 1935.

Chief Surveyor for this firm since 1946.

Responsible charge of all types of surveys and mapping, from small property surveys to extensive surveys and mapping for large engineering projects, including: large hydroelectric developments with dams, reservoirs, tunnels, transmission lines, highways, and roads located in very rough mountainous terrain.

Previous experience from 1935 to 1946 in surveying and related engineering work with the Kansas State Highway Commission, the Shasta County Surveyor's Office, U. S. Corps of Engineers, and private firms.

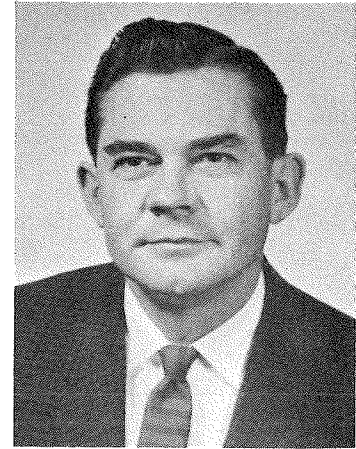


JOHN A. JENSEN

Chief Engineer

EDUCATION AND REGISTRATION

University of Nevada – Mechanical Engineering
Texas Technical College – Mechanical Engineering
University of Nevada – B.S., Civil Engineering, 1953
Registered Civil Engineer – California
Registered Structural Engineer – California



PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
California Water Pollution Control Association
Structural Engineers Association of Central California
Phi Kappa Phi

PROFESSIONAL RECORD

Broad experience in the general field of civil engineering since 1953. Chief Engineer of this firm since 1959.

Chief Engineer in responsible charge of a wide range of engineering projects. These include: design and construction supervision of water and sewerage systems, irrigation and storm drainage systems, bridges, schools, commercial and industrial buildings, utility systems for industrial plants, and other related projects. Also responsible for the preparation of engineering investigations and reports for such projects and for engineering inventories and appraisals of utility systems.

Experience as Structural Engineer using structural steel, reinforced and prestressed concrete, timber and masonry in design of bridges, buildings, and various other complex structures.

1946 to 1951, Manager of lumber business.

JOSEPH E. PATTEN

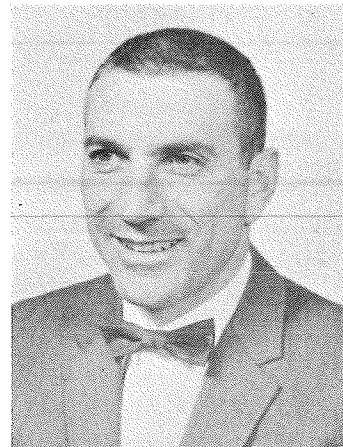
Chief Engineer — Water Resources

EDUCATION AND REGISTRATION

University of Santa Clara — B.S., Civil Engineering, 1948
Registered Civil Engineer — California

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
National Reclamation Association
Feather River Project Association — Director



PROFESSIONAL RECORD

Extensive experience since 1948 in planning, design, construction, and administration of water resources development projects.

Since 1958, first as Water Resources Engineer and then as Chief Engineer Water Resources in responsible charge of planning for major water resources development projects involving essentially all multiple use functions such as conservation, flood control, hydropower, preservation of fish and wildlife, and water conveyance and distribution. Also in responsible charge of all work associated with water rights and engineering for litigation associated therewith. Directed work on the proposed Iron Canyon Project on Sacramento River, Paskenta Project on Thomes Creek, and Cache Creek Development. Represented a number of irrigation districts' interests before the State Water Rights Board and others relating to the Sacramento River water rights hearings and negotiations for settlement of water rights.

From 1948 to 1958, first as Planning Engineer with the U. S. Bureau of Reclamation preparing preliminary plans and reports on the Trinity and Feather River projects and then as Manager of Shasta County Department of Water Resources.

HARLAN E. MOYER

Assistant Chief Engineer

EDUCATION AND REGISTRATION

University of Nevada – B.S., Civil Engineering, 1952
Registered Civil Engineer – California

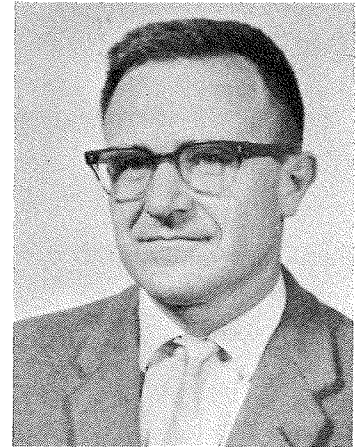
PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

PROFESSIONAL RECORD

Experience since 1952 in project engineering management and administration of a wide variety of engineering projects.

Assistant Chief Engineer in responsible charge of preliminary planning, project design, and construction supervision of specific major projects for clients, including; U. S. Air Force, Corps of Engineers, municipalities, and utility districts. These projects include the \$20,000,000 family housing development at Beale Air Force Base with its attendant utility systems and road network. Other projects at Beale Air Force Base include the \$500,000 NCO Club, communications buildings, and other facilities. Recent projects in the sanitary engineering field are represented by more than \$3,000,000 of sewage collection systems, pumping stations, and disposal facilities engineered for the South Tahoe Public Utility District. Projects for the Corps of Engineers include buildings, roads, and utilities which have been designed since 1955 to the present. Also responsible for the preparation of engineering reports and feasibility studies.



MELVIN P. LANDIS

Assistant Chief Engineer – Sanitary

EDUCATION AND REGISTRATION

San Francisco Junior College – A.A. , 1941
University of California – B.S. , Mining and Metallurgy,
1943
Yale University – AAF Technical Training course, 1943
International Correspondence Schools – Civil and Sanitary
Engineering
Registered Civil Engineer – California
Registered Professional Engineer – Kansas and Nevada



PROFESSIONAL AFFILIATIONS

American Water Works Association
Water Pollution Control Federation
National Society of Professional Engineers
American Society of Civil Engineers
Association of Engineering Geologists

PROFESSIONAL RECORD

Experience since 1943 in the general field of engineering. As Assistant Chief Engineer, Sanitary, since 1962, in responsible charge of design of facilities for the treatment and distribution of water and for the collection and treatment of sewage, including industrial wastes.

From 1960 to 1962, first as Mechanical Engineer, Utilities, at McClellan Air Force Base and then as Partner in Raupp, Christensen & Kendall, Surveyors and Engineers of Folsom, California.

Ediger Engineering Company, Wichita, Kansas, 1946 to 1960, as Chief Engineer for the last 10 years in responsible charge of design and administration for engineering and architectural projects, including: sewage works, water works, airports, street improvements, and many other miscellaneous projects. Design work for water treatment plants, both new and existing, was major part of this work.

U. S. Army Air Force, 1943 to 1946. Last two years as Development and Design officer at Wright Field, Dayton, Ohio.

EDWIN B. WORD

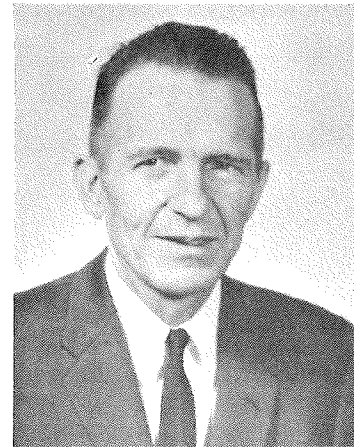
Assistant Chief Surveyor — Special Projects

EDUCATION AND REGISTRATION

Pasadena Junior College
Oregon State College, School of Forestry
Licensed Land Surveyor — California

PROFESSIONAL AFFILIATIONS

American Congress of Surveying and Mapping
American Society of Civil Engineers



PROFESSIONAL RECORD

Experience since 1936 in a broad field of surveying and civil engineering.

Assistant Chief Surveyor in responsible charge of specific major projects such as: reservoirs, tunnels, canals, transmission lines, and roads.

Experience with this firm since 1947 includes preparation of feasibility studies and the design and construction supervision of airports, subdivisions, sewage disposal plants, water systems, and pumping plants. Also surveys and mapping for hydroelectric projects, highways, transmission lines, reservoirs and irrigation projects by both ground and photogrammetric methods; including precise control surveys in rough isolated terrain and detail surveys of final sites. Also Resident Engineer on large construction projects.

Previous experience from 1936 to 1947 in surveying and construction with various public bodies in Oregon, with the Bonneville Power Administration and private firms of engineers and contractors.

CHARLES L. HORNBECK

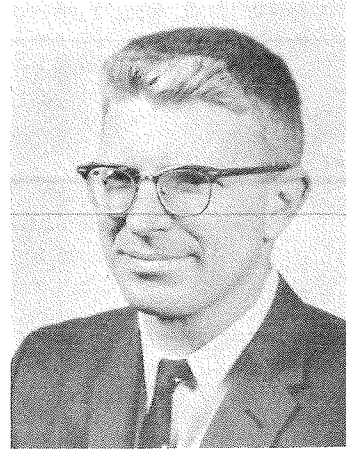
Assistant Chief Surveyor — Special Projects

EDUCATION AND REGISTRATION

University of California — B.S., Civil Engineering, 1951
Registered Civil Engineer — California

PROFESSIONAL AFFILIATIONS

American Congress of Surveying and Mapping
American Society of Civil Engineers



PROFESSIONAL RECORD

Experience in surveying, mapping, and administration since 1951.

Assistant Chief Surveyor in responsible charge of specific major projects.

Experience includes office administration and supervision of the office work for 20 survey crews, using 15 computers and draftsmen, on all types of surveys, including property, mapping control, high voltage transmission line and road location. Also supervised various phases of subdivision design and construction, and surveys for ballistic missile sites and hydroelectric complexes. Also experienced in field work for property, mapping control, and communication surveys. Developed programs for survey and accounting problems on general purpose computers and tabulating machines. Complete supervision of mapping, right-of-way descriptions and plots, and tower staking of approximately 430 miles of 230 kv transmission lines in California and Colorado. Maximum of 7 field crews and 15 computers and draftsmen were used on this work. Also experienced in field work for property, mapping control, and communication surveys.

From 1948 to 1950, summer experience with Bureau of Reclamation as surveyor and hydrologist.

ROBERT U. BRAITHWAITE

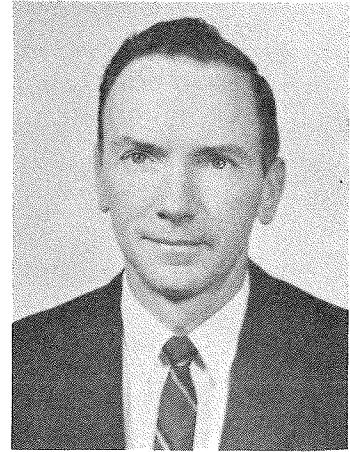
Assistant Chief Engineer – Structural

EDUCATION AND REGISTRATION

Utah State University – B.S., Civil Engineering, 1951
Registered Civil Engineer – California
Registered Structural Engineer – California

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
Sigma Tau



PROFESSIONAL RECORD

Experience in civil and structural engineering since 1951 and with the firm since 1956.

As Assistant Chief Engineer, Structural, in responsible charge of structural design of bridges, buildings, and other structures. Experience using structural steel, reinforced and prestressed concrete, timber, and masonry; includes: design of all types of complex structures, highway bridges, schools, hospitals and buildings for commercial, industrial, and governmental use. Certified by Department of Defense as proficient in fallout shelter analysis and responsible for such analysis for all buildings, tunnels, etc., in seven Northern California counties.

California Division of Highways Bridge Department, 1951 to 1956. Assistant Bridge Engineer with experience as Resident Engineer on bridge construction.

GRANT A. ENGSTROM

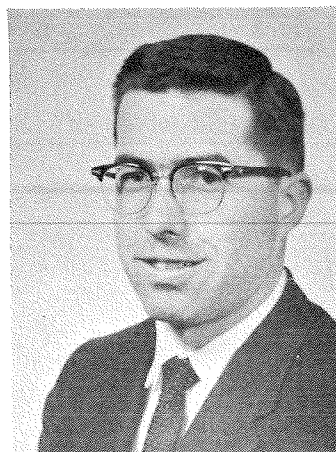
Engineer-in Charge
Sacramento Area Office

EDUCATION AND REGISTRATION

University of Nevada — B.S., Civil Engineering, 1955
Registered Civil Engineer — California
Registered Structural Engineer — California

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
Structural Engineers Association of Central California



PROFESSIONAL RECORD

Experience in the general field of civil engineering since 1948 and with this firm since 1955.

As Engineer-in-Charge of Sacramento Area Office, responsible for administration of the branch office and all engineering work carried on under that office. Experience includes: preparation of engineering investigations and reports; the design of a variety of bridges, buildings, and other complex structures using structural steel, reinforced and prestressed concrete, timber, and masonry; design of sewer and water systems; street and road design; irrigation projects; and subdivision engineering.

Between 1948 and 1954; diversified experience with California Division of Highways and U. S. Army Corps of Engineers.

DONALD R. MAYER

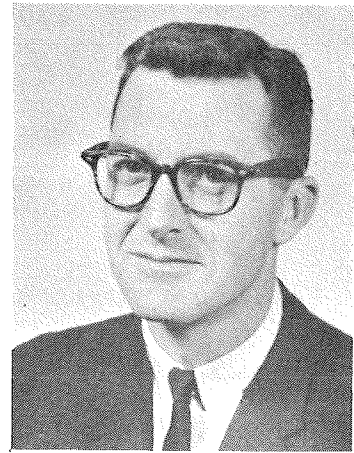
Chief Photogrammetrist

EDUCATION AND REGISTRATION

St. Mary's University — Photogrammetric Course
International Correspondence Schools — Civil Engineering
California Photogrammetric Certificate

PROFESSIONAL AFFILIATIONS

American Society of Photogrammetry



PROFESSIONAL RECORD

Experience in preparation of planimetric and topographic maps compiled by aerial photogrammetric methods since 1947.

Chief Photogrammetrist, in responsible charge of all photogrammetry since 1955, supervises flight planning, photography, selection of field controls, operation of Kelsh and Balplex plotters and the preparation of maps by scribing and photo reproduction. Also executes the operation of Balplex 760 Aero-Triangulator, utilizing various techniques for an integrated bridging operation in conjunction with the Kelsh plotters. Responsible for development of techniques now in use and active in research for new techniques and applications of photogrammetry and photo interpretation.

Jack Ammann Photogrammetric Engineers of San Antonio, 1953 to 1955. Stereo-operator and Assistant Supervisor. Work included research and tests with various equipment for development of new techniques.

Aero Surveys, Ltd., and Photographic Surveys, Ltd., Vancouver, B. C., 1947 to 1953. Experience included field control surveys, land surveys, photo identification and interpretation, and operation of plotters.

DONALD PONKE

Office Engineer

EDUCATION AND REGISTRATION

Chico State College – B.S., Civil Engineering, 1958
Registered Civil Engineer – California

PROFESSIONAL AFFILIATIONS

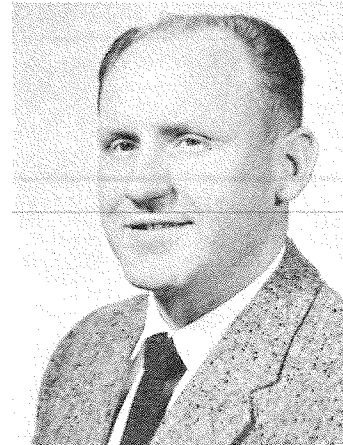
National Society of Professional Engineers

PROFESSIONAL RECORD

Experience in land surveying and civil engineering since 1958.

Office Engineer in responsible charge of survey computing and road design sections of Clair A. Hill & Associates.

Experience includes design of sewer and water systems, road location and design, land and route surveying, and general construction surveying.



C. HAL HARNED

Engineering Geologist

EDUCATION AND REGISTRATION

Kansas State University — B.S., Geology, 1937
M.S., Engineering Geology, 1939

PROFESSIONAL AFFILIATIONS

California Association of Engineering Geologists
American Society of Civil Engineers
Sigma XI
Gamma Sigma Delta
Phi Kappa Phi



PROFESSIONAL RECORD

Experience and teaching in the field of Engineering Geology since 1939, with major contribution to the field of Structure Foundation Mechanics. Associate of Clair A. Hill since 1960 in responsible charge of all foundation investigations, including field and laboratory operations.

U. S. Bureau of Public Roads, 1955 to 1960. Chief of Structure Foundations in Washington, D. C., and a member of the Chief Engineer's staff for the Division of Bridges and Highway Structures.

California Division of Highways, Bridge Department, 1947 to 1955. First as Senior Engineering Geologist and then as Supervising Engineering Geologist, responsible for all structure foundation field investigations and design recommendation reports pertaining to structure foundations.

Kansas State University, 1944 to 1947. Research Engineering Geologist and Instructor.

Kansas State Highway Department, 1939 to 1944. First as Engineering Geologist and then as Chief Engineering Geologist, responsible for conducting field studies and preparing reports dealing with groundwater, highway drainage, classification of excavation, location and evaluation of road metal sources, slope stability analysis, and structure foundations.

Served on numerous national committees dealing with the various aspects of foundation mechanics. Author of U. S. Government publication "Some Practical Aspects of Foundations for Highway Structures." Talks and lectures delivered throughout the United States exerted strong influence on modern engineering practices pertaining to field investigation methods, analysis, and design and construction utilization of foundation data.

JOHN J. TWITCHELL

Soil Scientist

EDUCATION

University of California at Berkeley
B.S., Soil Science, 1950

PROFESSIONAL RECORD

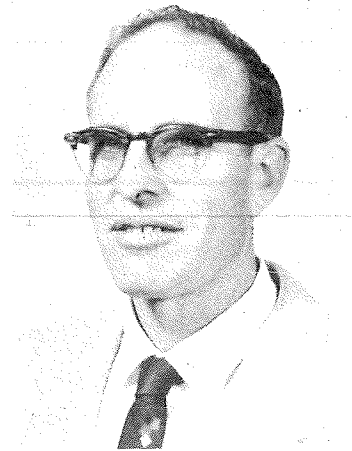
Experience since 1951 on large earthwork projects and soils laboratories. In responsible charge of laboratory and field testing for earthwork and concrete projects for this firm since 1959.

Senior Field Engineer for Bechtel Corporation from 1955 to 1959 and served as Chief of Soils Laboratory on large earthwork projects, including Nacimiento Earthfill Dam in California and Swift Hydroelectric Project Earthfill Dam in the State of Washington.

During 1955 served as Assistant Chief of Soils Laboratory and later as Chief of Soils Laboratory on Santa Felicia Earthfill Dam for United Water District, Ventura County, California.

Engaged by the University of California at Berkeley in 1954 and 1955 as Senior Laboratory Technician, Soils Department in charge of field and laboratory investigation of soil amendments on the physical and chemical properties of compacted soils.

Employed by the Bureau of Reclamation from 1951 to 1954 in the Materials Laboratory on the South Coast Conduit Project, Santa Barbara, California, and in charge of the Soils Laboratory, Classifying Section, Miles City, Montana.



PHILIP A. MATHER

Staff Engineer

EDUCATION AND REGISTRATION

Clarkson College of Technology — BCE, 1950
Registered Professional Engineer — New York

PROFESSIONAL RECORD

Experience since 1950 in planning, design, and construction of major power and irrigation projects and structures related thereto.

As Staff Engineer since 1959, work has included design of the Stumpy Meadows Dam and Reservoir complex, as well as several smaller structures and the feasibility planning of major hydraulic projects for the provision and distribution of new irrigation water.

Experience prior to 1959 was gained largely during an eight-year period of employment with a major eastern electric utility company. Responsible for design and supervision of construction of segments of a major expansion program by this company. Included were: earth and concrete dams, penstocks, powerhouses, other major hydraulic structures, and support facilities; such as, new roads and bridges. During this period, also associated with the Norman Gibson Consulting Group, which engages in the acceptance testing of hydraulic turbines.



WILLIAM T. O'LEARY

Staff Engineer

EDUCATION AND REGISTRATION

University of Santa Clara – B.S., Civil Engineering, 1950
Registered Civil Engineer – California

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
Tau Beta Pi



PROFESSIONAL RECORD

Experience in water supply, hydraulics, storm drainage, and municipal improvement projects since 1950.

As Staff Engineer with this firm since 1959 prepared plans and specifications and supervised construction of water conveyance systems, water supply projects, irrigation systems, and sewer systems. Also prepared reports and design studies for improvements to water and sewer systems and irrigation projects.

As design engineer for Porter, Urquhart—Skidmore, Owings and Merrill in their design of five U. S. air bases in French Morocco, his work entailed preparation of reports, plans, and specifications for all aspects of the water systems for these bases. As a civil engineer with the consulting firm of James J. Breen & Associates in the Bay Area of California, designed water and storm drainage projects and did the preliminary planning, as well as design, of several large municipal developments.

ROBERT R. CHATFIELD

Land Planner

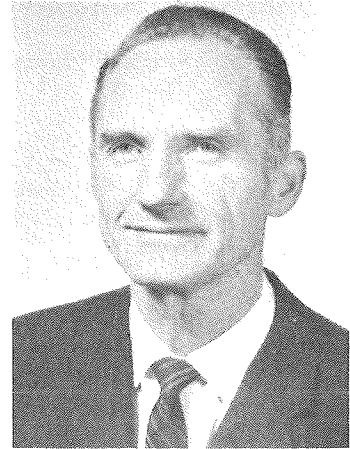
EDUCATION

Mesa County Junior College

PROFESSIONAL AFFILIATIONS

American Society of Planning Officials
Engineering Forum

PROFESSIONAL RECORD



Experience in land planning, engineering, and surveying since 1949.

As Land Planner for this firm since 1953, responsible for the detailed planning of subdivisions, industrial parks, shopping centers and recreational facilities, presentations to planning commissions, and supervision of construction.

Responsibilities also included supervision of drafting department, working on all types of engineering design drawings, survey plots, and maps.

Previous work included experience in surveying, planning, and drafting.

ROBERT A. SONDAG

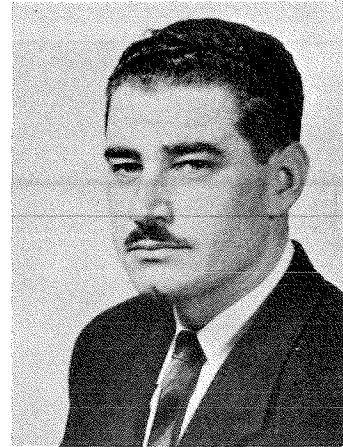
Staff Engineer

EDUCATION AND REGISTRATION

Stanford University – B.S., Civil Engineering, 1955
Registered Civil Engineer – California

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
California Society of Professional Engineers
National Society of Professional Engineers



PROFESSIONAL RECORD

Experience in engineering and construction since 1955.

Staff engineer for this firm since 1961 and responsible for preparation of contract documents, including specifications and engineering cost estimates. Also responsible for engineering for new subdivisions and municipal improvements.

Packard, Muir & Train, Inc., Sacramento, 1958 to 1961. Responsible for preparation of engineering plans and construction supervision for subdivisions and municipal improvements.

From 1955 to 1958, as construction engineer, Superintendent for W. M. Lyles Company, California, in responsible charge of estimating, bidding, and constructing major pipelines for petroleum products, municipal, and private water distribution and sewage facilities, and numerous other types of underground facilities, including storm drainage and electrical distribution systems.

ALAN T. HILL

Project Engineer

EDUCATION

Shasta Junior College – A.A., 1959
University of Nevada – Civil Engineering, 1961

PROFESSIONAL AFFILIATIONS

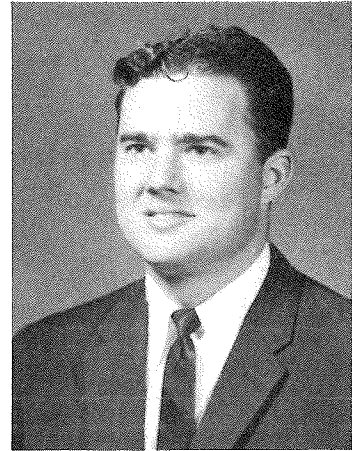
American Society of Civil Engineers

PROFESSIONAL RECORD

Experience in land surveying and civil engineering since 1952.

Project Engineer in responsible charge of survey supervision on hydroelectric project.

Experience includes land and route surveying, road location and design, control surveys, and construction stakeout.



C. ROBERT SCHOBERT

Locating Engineer – Roads

EDUCATION AND REGISTRATION

Oregon State College – B.S., Chemical Engineering, 1943
E.I.T. Certificate – California

PROFESSIONAL AFFILIATIONS

Sigma Tau
Phi Lambda Upsilon



PROFESSIONAL RECORD

Experience in surveying, engineering, and industry since 1934. With this firm since 1955.

As Locating Engineer, Roads, in responsible charge of locating roads in very rough mountain and timber country. Also experienced in land surveying, power transmission line location, and surveying for major hydroelectric projects.

Prior to 1955, experience included six years of chemical engineering in connection with the lumber industry, and twelve years of experience in land surveying, mapping, road and railroad location, and logging engineering.

NORMAN D. BRAZELTON

Staff Engineer

EDUCATION AND REGISTRATION

Fresno State College — B.S., Civil Engineering, 1960
Registered Civil Engineer — California

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

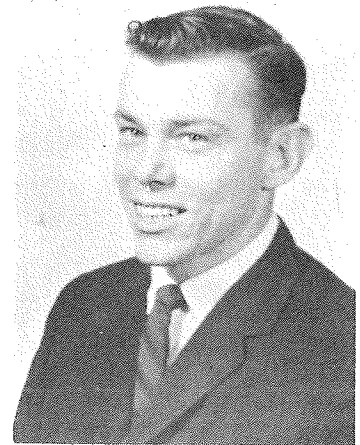
PROFESSIONAL RECORD

Experience in surveying and engineering since 1956.

Staff Engineer for this firm since 1960 primarily in the Water Resources Department. This included work on two feasibility reports for earthfill dams and irrigation systems, studies of water rights, and studies and designs of hydraulic structures.

California State Department of Water Resources, 1960. Road relocation design.

California Division of Highways, 1956 to 1960. Construction surveys, inspection, soil testing, and design of interstate freeways.



DONALD SHOWALTER

Staff Engineer

EDUCATION AND REGISTRATION

University of Nevada — B.S., Civil Engineering, 1956
Registered Civil Engineer — California

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

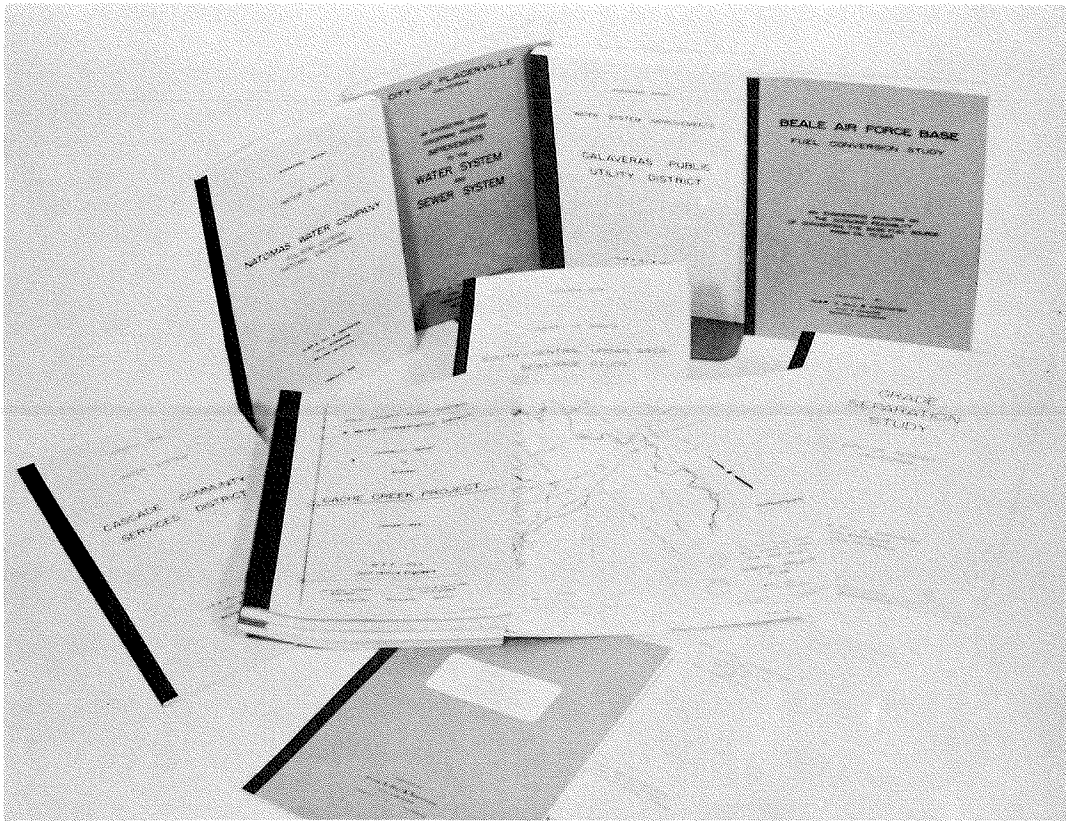
PROFESSIONAL RECORD

Staff Engineer with this firm since 1956.

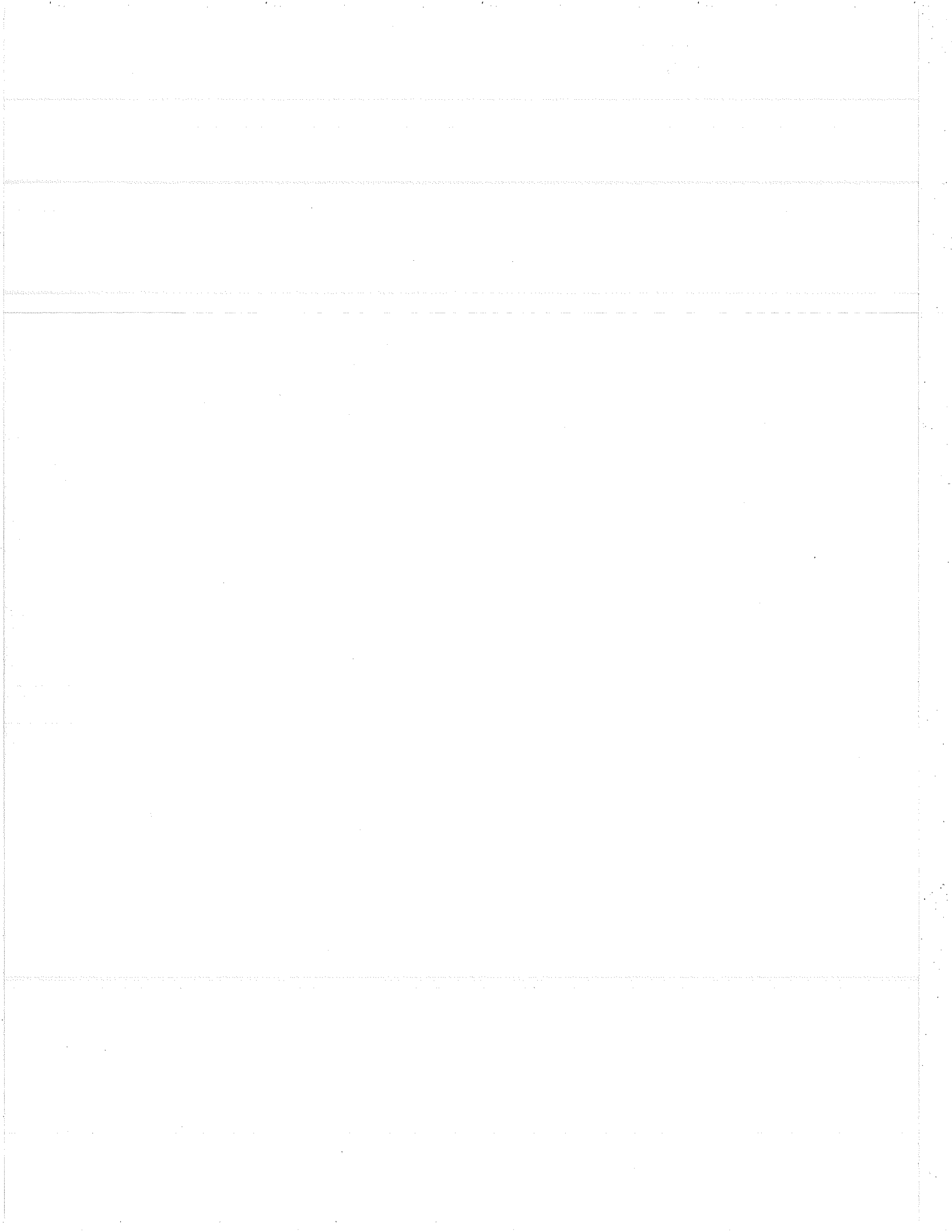
Major experience has been in the design phase of various types of civil engineering projects, including subdivisions, sewers, water systems, and buildings. Principal responsibility has been for preparation of construction plans and specifications.



INVESTIGATIONS & REPORTS



II



INVESTIGATIONS & REPORTS

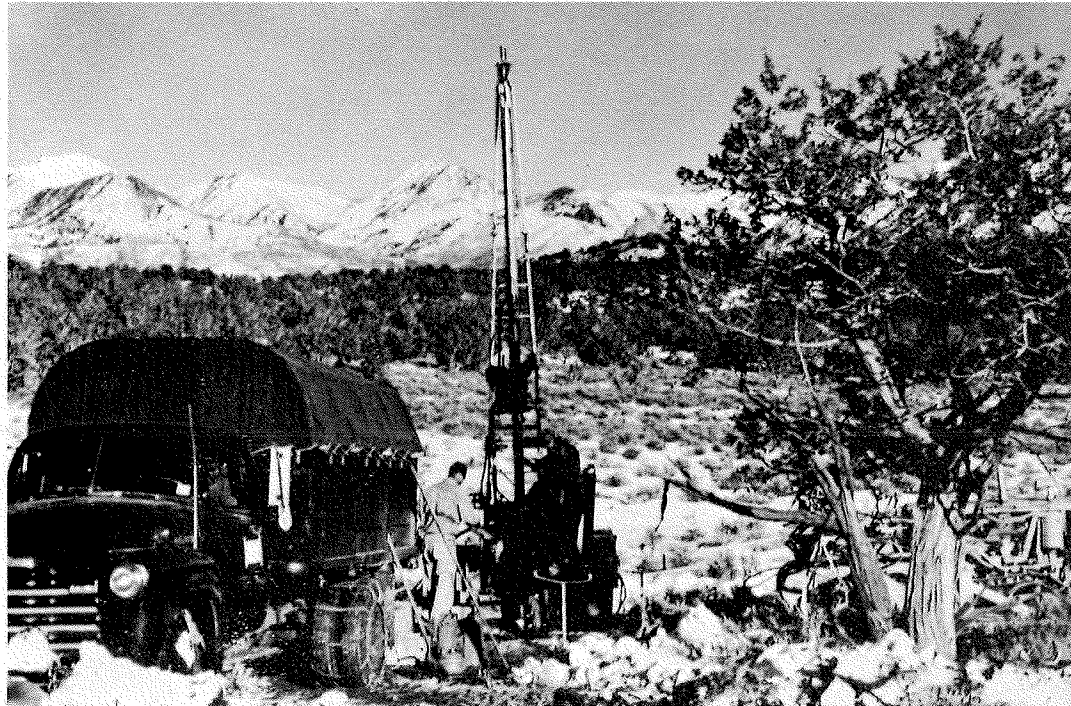
The imagination and versatility of the engineering staff is especially valuable in making a thorough investigation and report, since this phase of an engineering project forms the very foundation for the successful development and completion of an economical, efficient, and dependable project. Therefore, this firm places emphasis upon the completeness and adequacy of a carefully prepared report. Extensive use is made of tables, graphs, drawings, and multicolor maps in order to present engineering and financial data and preliminary plans in a clear and concise manner.

In the course of making studies and investigations, extensive research is often necessary. Such research, with occasional assistance of special consultants, has developed new information or has led to new or improved methods. The following resulted from such research:

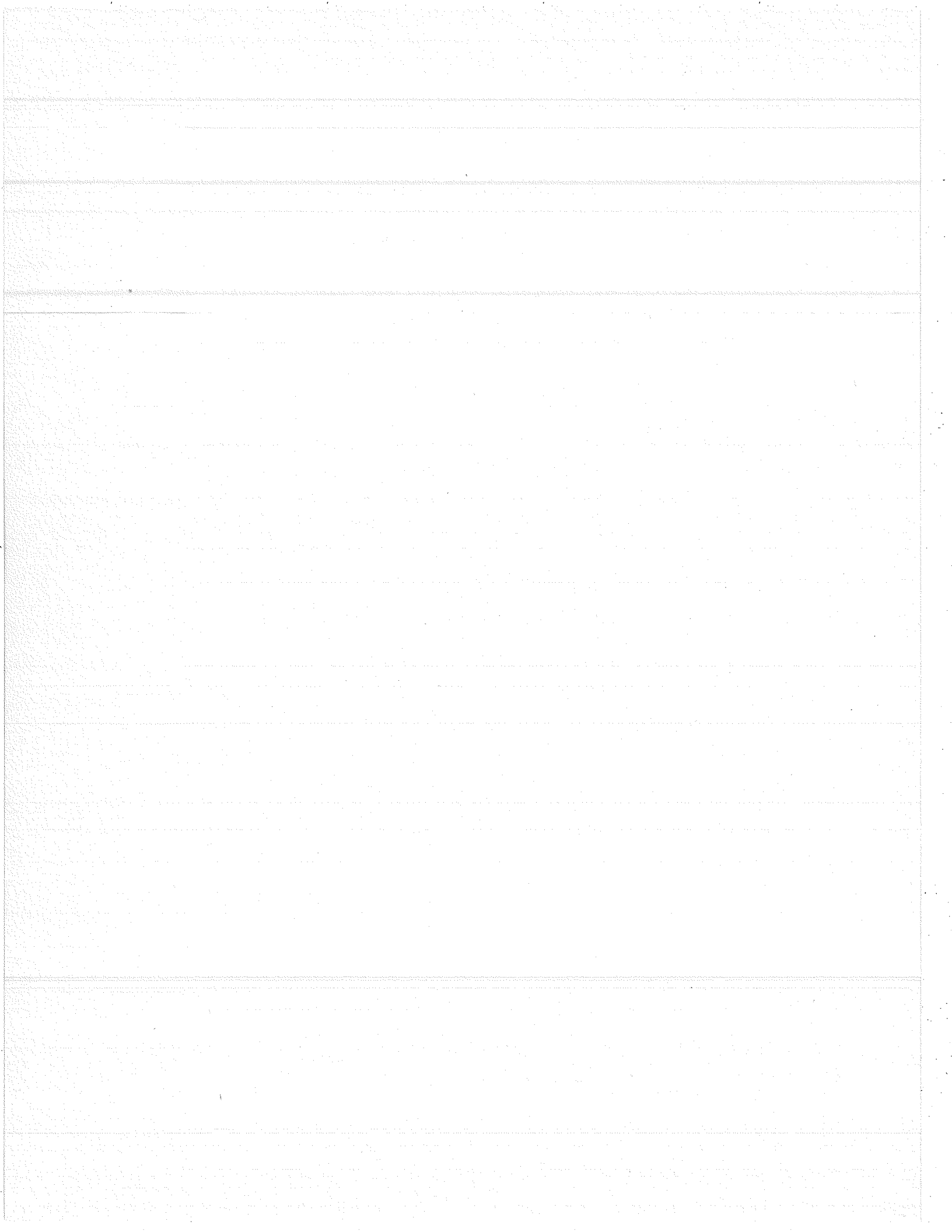
1. New methods for the measurement and identification of agricultural crops by photogrammetry and photo interpretation.
2. System for tertiary treatment of sewage based upon methods developed by the operation of a pilot plant, physically located in the community to be served.
3. New techniques in water management efficiency in irrigation, particularly for such crops as rice which use large quantities of water.

A partial listing of clients and projects is shown in other technical sections of this brochure.

FOUNDATION ENGINEERING



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FOUNDATION ENGINEERING

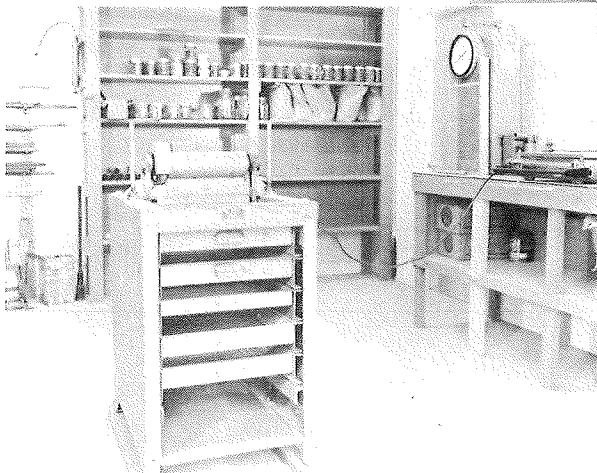
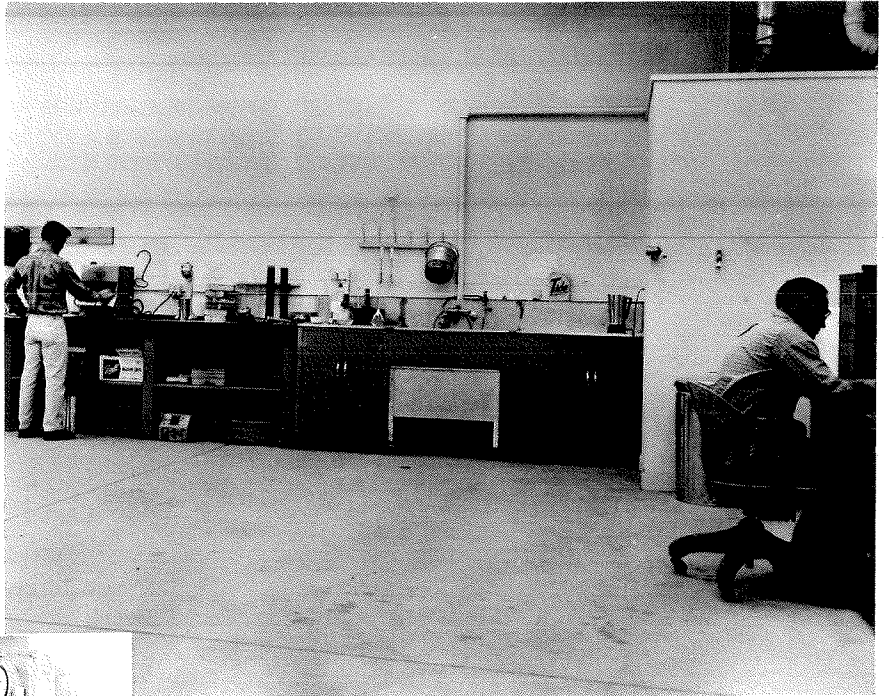
The Foundation Engineering staff has broad experience in the investigation and recommendation of structure foundations. All phases of field and laboratory operations for any size project are readily handled by the portable drilling equipment and a modern laboratory.

Complete field exploration and sampling, including diamond drilling, obtaining undisturbed samples, and penetrometer tests are provided by a portable drilling and fully equipped four-wheel drive drill truck. Access in more difficult terrain is provided by track-layer tractor.

The laboratory is equipped to perform such tests as unconfined compression and consolidation for use in determining foundation recommendations. It is also capable of performing the testing for construction control on building, road, dam, and other projects.

TESTING & FIELD OPERATIONS

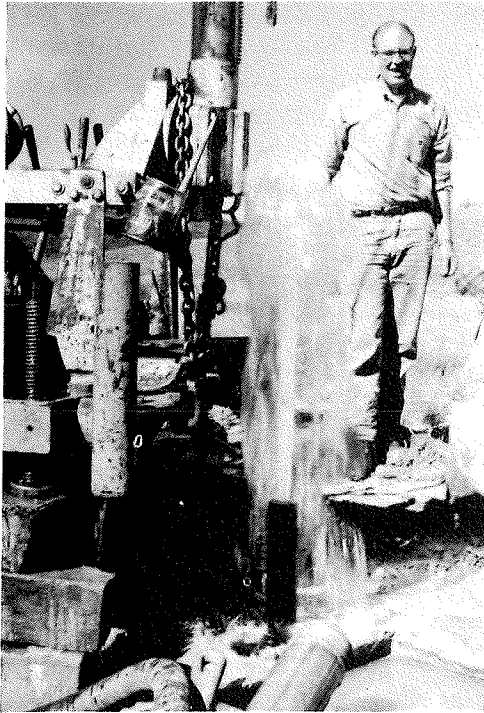
**General View of a Portion
of the Soils Laboratory**



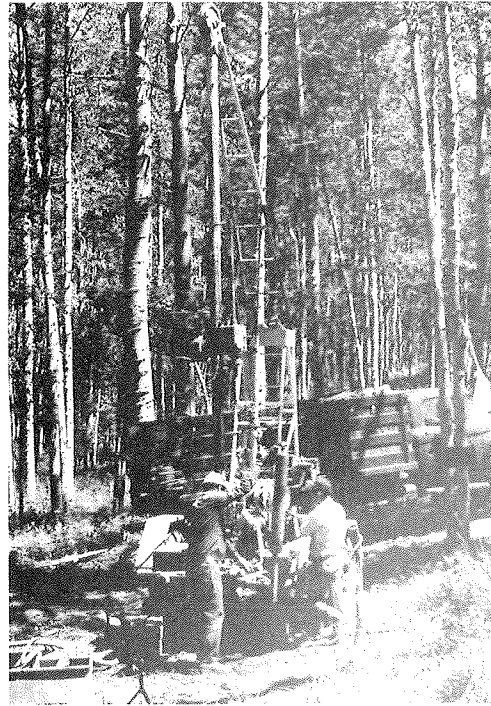
Soils Receiving Room. Screening and storage of samples. Concrete compression tester on right bench.



Compaction Test. To determine maximum density and optimum moisture content of soil materials under standard conditions.



"Thar She Blows" Artesian water intercepted while making a foundation boring. The boring was less than 40 feet deep, was 2-1/4 inches in diameter, and the flow was in excess of 100,000 gallons per day. The water was heavily charged with carbon dioxide.

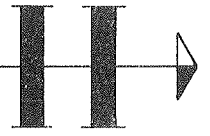


Foundation Studies for a strain-tower on a 230 kv power transmission project for the U. S. Bureau of Reclamation on the Black Mesa in the Colorado Rocky Mountains. The altitude at this site is in excess of 9,000 feet.

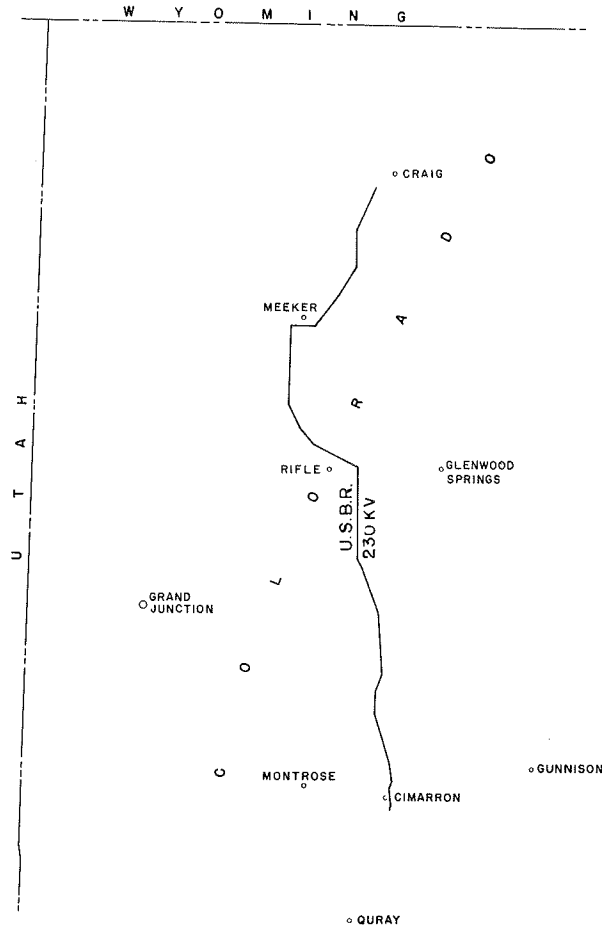
Drilling and Sampling Foundation Material at the proposed location for a channel pier for the Tanana River bridge near Nenana, Alaska. The structure in the background is a portion of an 800-foot through truss of the Alaska Railroad bridge.



REPRESENTATIVE PROJECTS



ROUTE OF TRANSMISSION LINE



TRANSMISSION LINE TOWER FOUNDATION INVESTIGATIONS

CLIENT: U. S. Bureau of Reclamation
State of Colorado

Geologic and soils reconnaissance, together with the necessary drilling, sampling, testing, analysis of data, and foundation design-recommendation reports were provided for approximately 150 miles of 230 kv power transmission traversing the western slope of the Rocky Mountains.

Factors such as a stratigraphic sequence extending from the pre-Cambrian to the recent, areas of heavy timber and brush cover within national forests, a dearth of access roads, high relief, slide areas, winter operations, which imposed deep snow and temperatures to 35 degrees below zero, and much of the line traversing altitudes in excess of 8,000 feet kept the foundation studies for tower sites on this job out of the category of "routine investigations."

PARTIAL LIST OF CLIENTS

City of Red Bluff

City of Santa Cruz

Del Norte County Department of Public Works

Shasta County Department of Public Works

Siskiyou County

State of Alaska

Nevada State Highway Department

U. S. Bureau of Public Roads

U. S. Forest Service

U. S. Bureau of Reclamation

U. S. Park Service

Byron-Bethany Irrigation District

Georgetown Divide Public Utility District

Glenn-Colusa Irrigation District

Yolo County Flood Control & Water Conservation District

Bella Vista School District

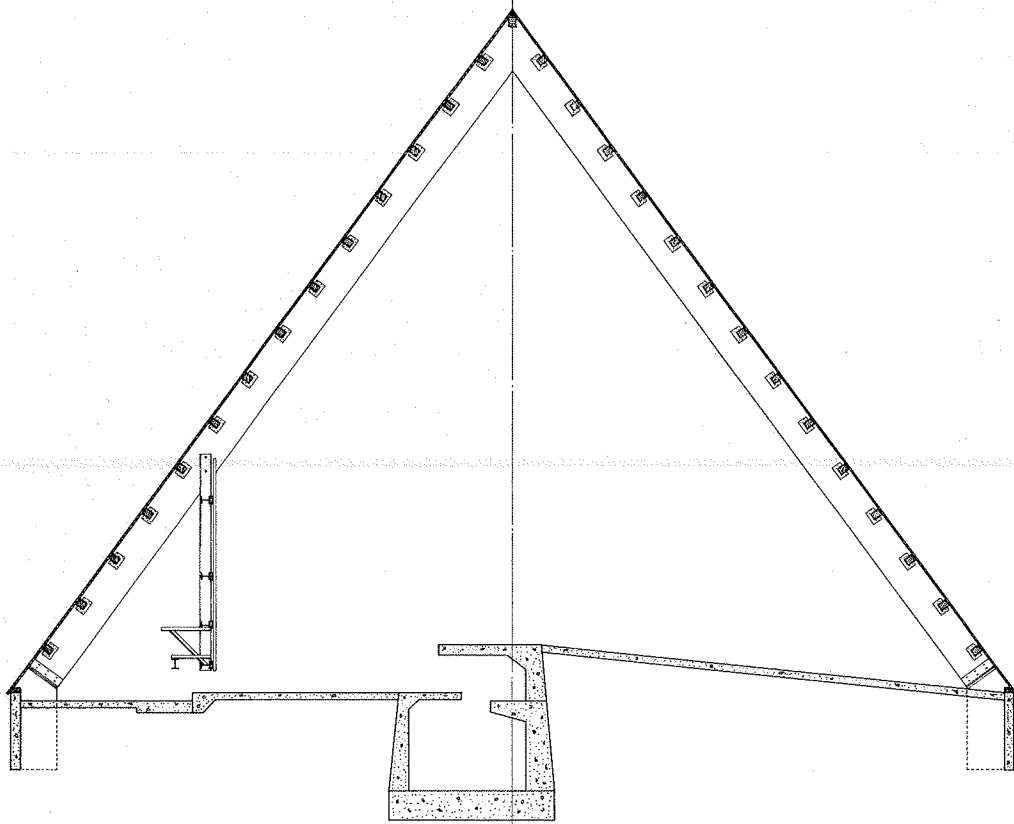
College of the Siskiyous

Burnt Ranch School District

Cottonwood School District

Kimberly Clark Corporation

STRUCTURAL ENGINEERING



II

STRUCTURAL ENGINEERING

The Structural Engineering staff is experienced in a variety of projects utilizing both conventional and modern construction techniques.

Knowledge of special design requirements for such projects as schools, hospitals, industrial and commercial buildings, and bridges is available for every project, whether large or small, simple or complex. Experience includes the use of structural steel, timber, masonry, conventional reinforced concrete, precast and prestressed concrete, and tiltup concrete.

Preliminary studies to determine economical construction, design, preparation of construction plans and specifications and construction supervision are provided by the Structural Engineering staff. Related services such as foundation investigations, design of water, sewer, streets, drainage and other support facilities, construction inspection, and laboratory testing are also available to give the client the benefit of a complete service on every project.

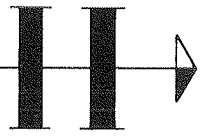
INVESTIGATIONS & REPORTS

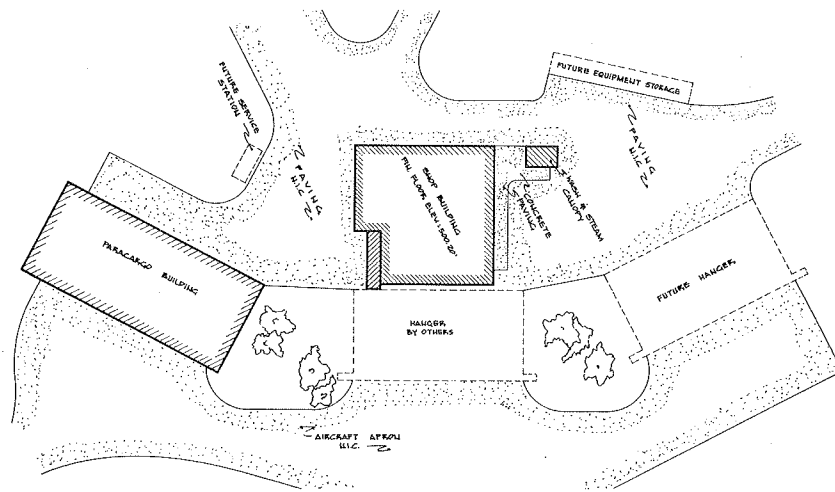
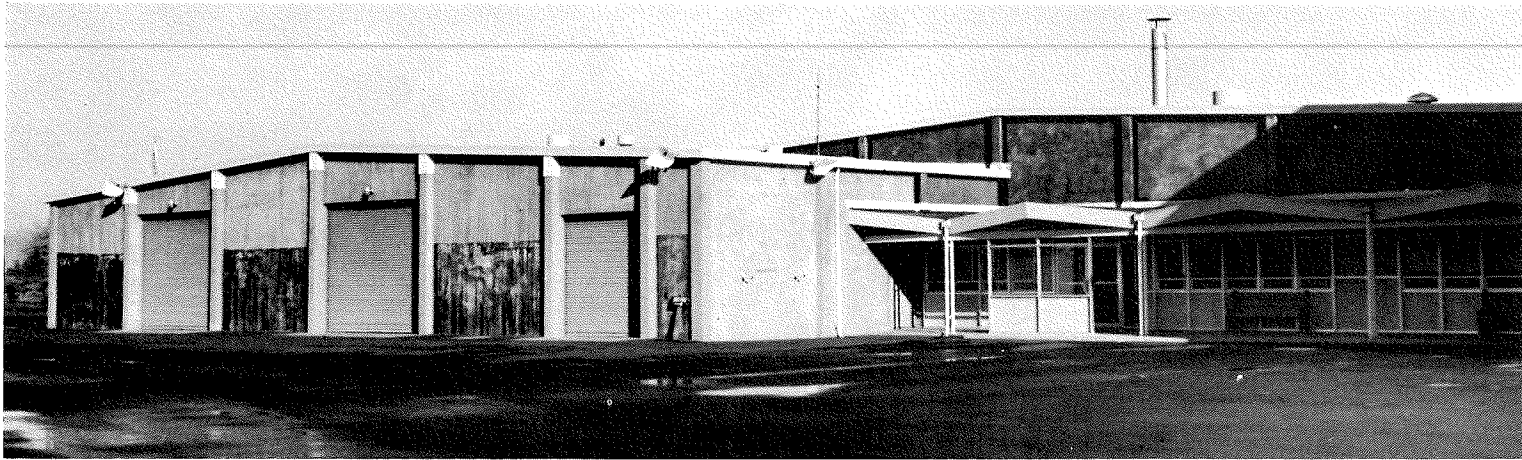
SITE SURVEYS
FOUNDATION STUDIES
EXISTING BUILDINGS & STRUCTURES
ECONOMIC STUDIES
PRELIMINARY DESIGNS

DESIGN & CONSTRUCTION SUPERVISION

BUILDINGS
BRIDGES
FOOTINGS
RETAINING WALLS
OTHER STRUCTURES
RELATED SERVICES & FACILITIES
 Grading & Drainage
 Water Supply & Distribution
 Sewage Collection & Disposal
 Streets and Parking Areas
 Railroads

REPRESENTATIVE PROJECTS





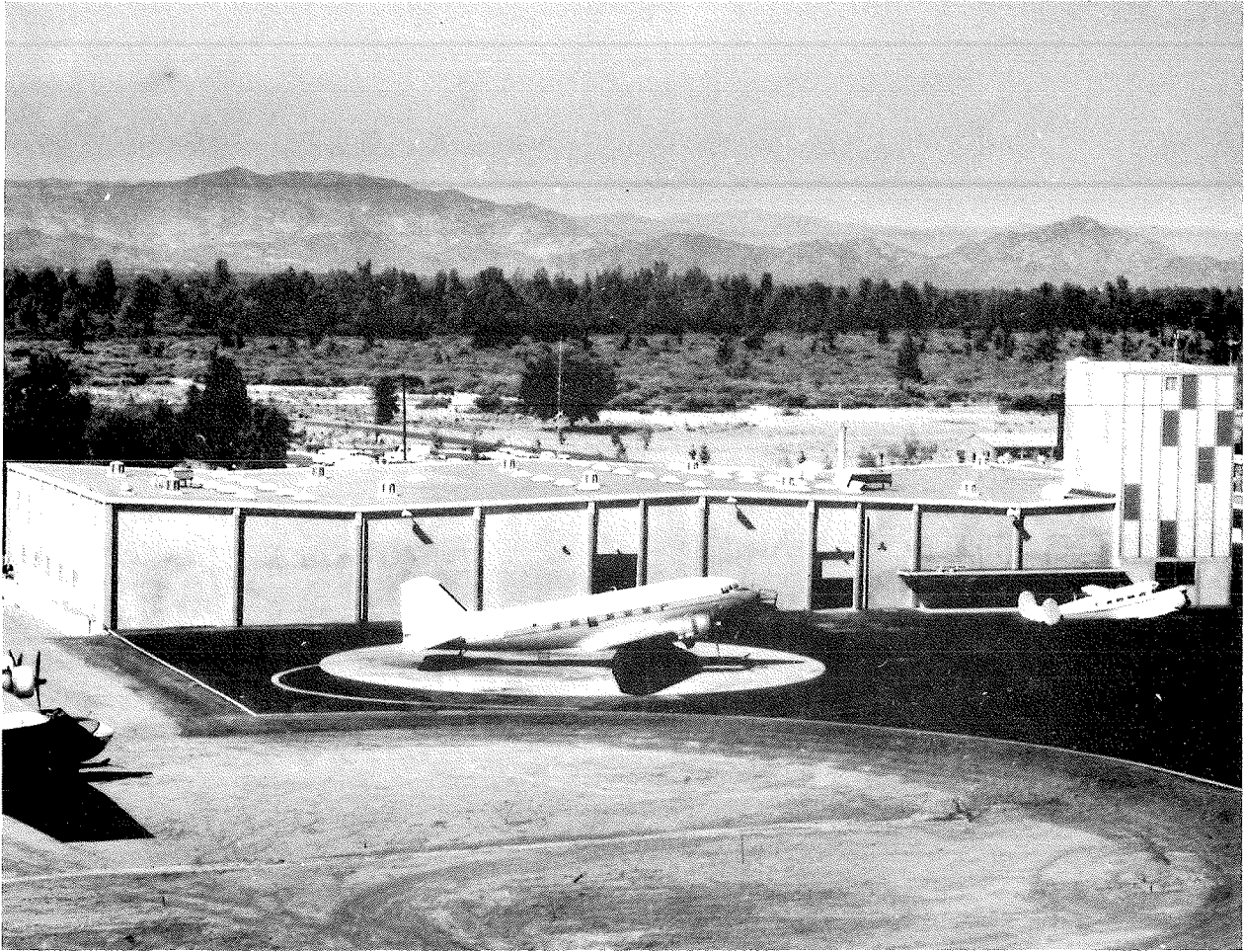
SHOP BUILDING

II

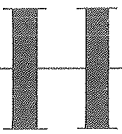
CLIENT: U. S. Forest Service
Shasta County, California

This building, designed with tilt-up concrete walls and heavy timber roof, was completed at a construction cost of \$242,000. Main clear span is 64 feet. The floor area comprises 22,500 square feet, and there is an additional 3,500 square feet in a mezzanine. Design includes a hot water, forced air heating system and space for heavy equipment repair, paint shop, radio shop, machine shop, and offices. Mechanical ventilation is provided.

Architectural, structural, mechanical, and electrical services were contributed.



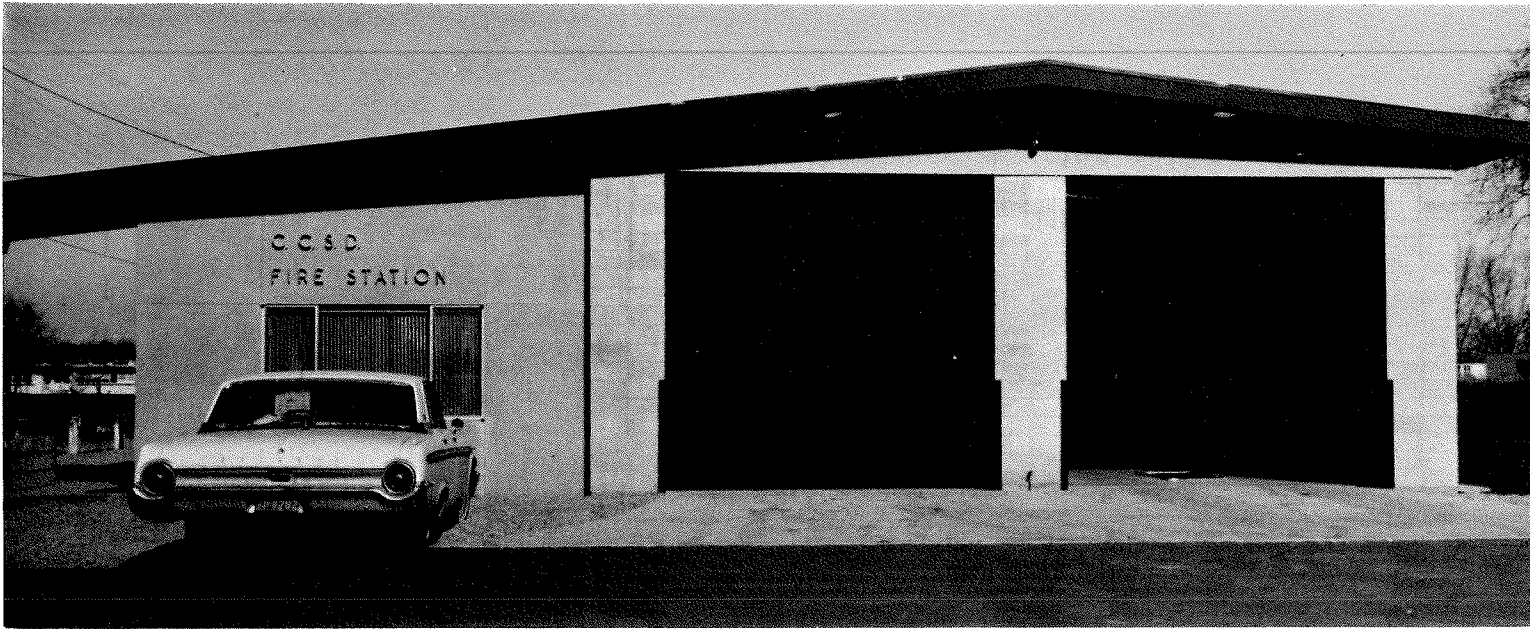
PARACARGO BUILDING



CLIENT: U. S. Forest Service
Shasta County, California

The Paracargo building, located at the Redding Municipal Airport, is an unusual type of structure. The planning required many design considerations to accommodate the types of use. It serves as a fire equipment center, aerial cargo, and smoke jumper base. This is the only building of its type in California. Complete planning, in accordance with definitive requirements of the U.S.F.S., was accomplished by Clair A. Hill & Associates. Final design and construction plans including architectural, structural, mechanical, and electrical services were furnished.

The building is designed with tilt-up concrete walls and a heavy timber roof. Partitions are of concrete or wood framing. The main floor area contains 29,000 square feet, with an additional 8,000 square-foot mezzanine floor. A 50-foot high, 24-foot square, structural steel tower for parachute drying is an integral part. The main floor includes administrative offices, storage and repair spaces for fire fighting equipment, food and supplies, parachute repair and packing, and weather bureau equipment. Offices and work spaces are completely air-conditioned and refrigerated storage is included for meat and perishable foods. This building was completed at a construction cost of \$341,000 in 1962.



FIRE STATION

II

CLIENT: Cascade Community Services District
Shasta County, California

This building, constructed of concrete block and frame walls with steel and wood roof framing, was built at a construction cost of \$30,000. Floor area consists of 2,500 square feet. This building provides office space for the District, plus two engine stalls, and cooking and sleeping facilities for four men.

Services provided included architectural design; structural, mechanical, and electrical engineering.



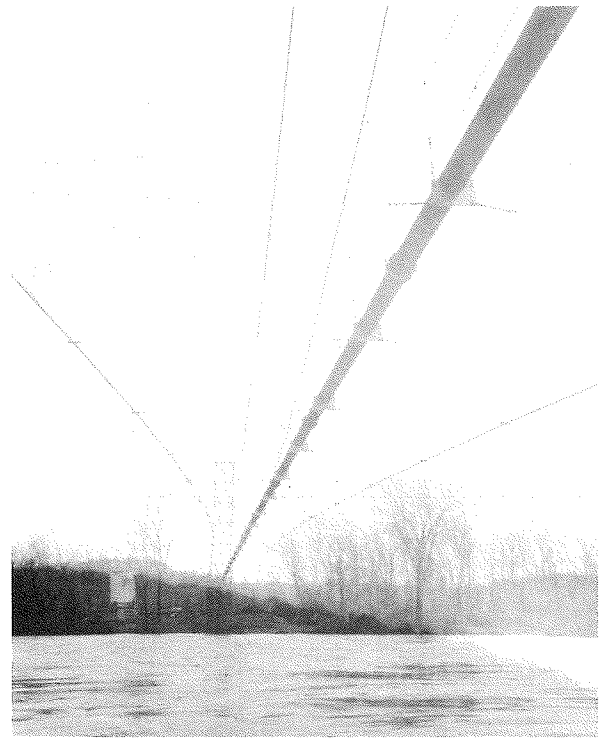
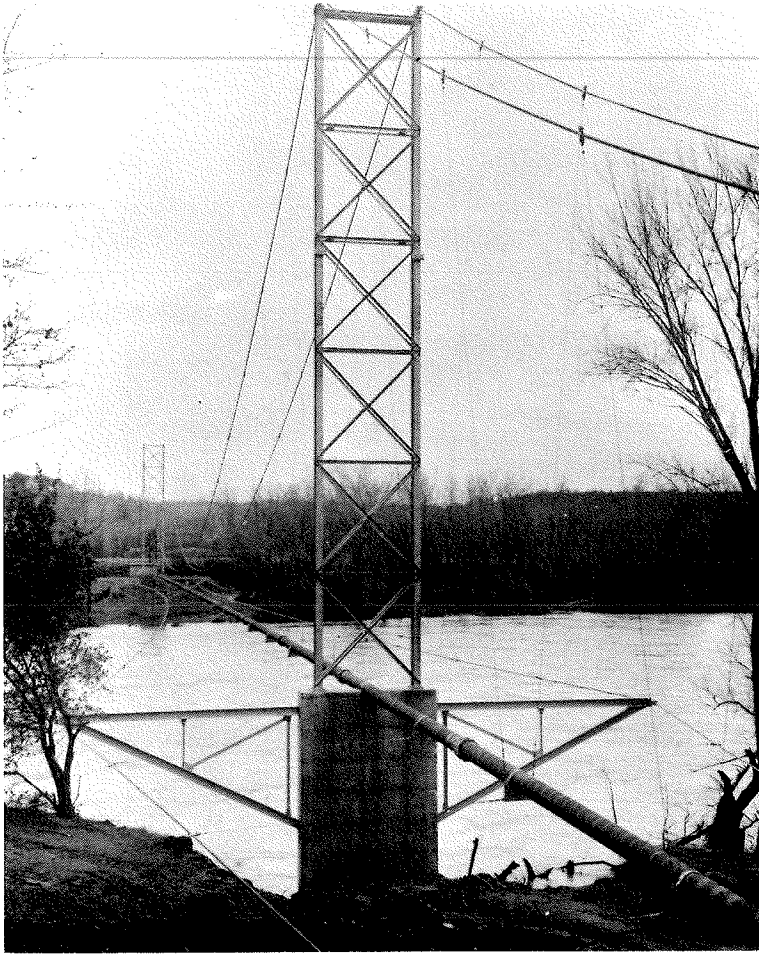
FIRE STATION



CLIENT: Enterprise Public Utility District
Shasta County, California

Concrete block walls with steel and timber roof are the key features of this building, which was erected at a construction cost of \$45,000. Total floor area is 4,000 square feet. Design includes space for a meeting hall, cooking and sleep-facilities for four fireman, four engine stalls, and shop area.

Services included were architectural design; structural, mechanical, and electrical engineering.



SACRAMENTO RIVER SUSPENSION BRIDGE

I I

CLIENT: City of Redding, California

A 460-foot main span suspension bridge supporting a 12-inch sewer pressure main crossing the Sacramento River. Part of an overall sewer main extension and expansion program designed to serve a growing community. Services included preliminary studies, design plans and specifications, and construction supervision.

PARTIAL LIST OF CLIENTS & PROJECTS

Bridges		Buildings	
Client	Project	Client	Project
Over 30 bridges have been designed during the past 10 years for the following clients:		Cascade Community Services District	Fire Hall (Redding)
City of Chico	M. G. Polk Bridge Ivy Street Bridge Little Chico Creek Bridges (2)	Enterprise Public Utility District	Fire Hall (Redding)
City of Dunsmuir	Butterfly Bridge	U. S. Army Corps of Engineers Sacramento District	Non-Commissioned Officer's Club Beale Air Force Base Emergency Power Building Mather Air Force Base
City of Redding	Sacramento River Suspension Bridge	U. S. Forest Service	Paracargo Building (Redding) Regional Shop Building (Redding)
City of Santa Cruz	Market Street Bridge Ocean Street Bridge Pedestrian Bridge Riverside Avenue Bridge	U. S. Plywood Corporation	Novoply Plant (Gaylord, Mich.)
Butte County	Butte Creek Bridge Cherokee Drain Canal Bridge	J. C. Felciano - Architect	West Cottonwood Gymnasium (Cottonwood)
Del Norte County	Hunter Creek Bridge Middle Fork Smith River Bridge Rowdy Creek Bridge Smith River Bridge	Allyn Martin - Architect	Bella Vista School (Bella Vista) Methodist Church Addition (Redding) Siskiyou College Gymnasium (Weed) Siskiyou College Student Center (Weed)
Glenn County	Briscoe Creek Bridge		
Shasta County	Burney Creek Bridge Castle Rock Bridge Churn Creek Bridge Clear Creek Bridge Cottonwood Creek Bridge Cow Creek Bridge Sacramento River Extension Bridge	Satterlee & Tomich - Architects	Central Valley High School (Central Valley) Enterprise High School Building (Redding) Shasta College Cafeteria (Redding)
Yolo County	Cache Creek Bridge	Smart & Clabaugh - Architects	Buckeye Elementary School (Buckeye) Buckeye Special Education School (Buckeye) Millville School (Millville) Junction School (Palo Cedro) Elks Building (Redding) Juniper School (Redding) Lassen View School (Redding) Memorial Hospital Addition (Redding) Shasta County Hospital Addition (Redding) Shasta County Office Building Prarie School (Redding) Siskiyou County Jail (Yreka) Siskiyou County Public Works Building (Yreka)
U. S. Air Force	Dry Creek Bridge Beale Air Force Base		
U. S. Army Corps of Engineers Sacramento District	Stony Creek Bridges (2) (Glenn County) North Fork Stony Creek Bridge (Glenn County)		
McCreary • Koretsky • Engineers	Rubicon River Bridge (Hell Hole) Middle Fork American River Bridge		
Pacific Telephone & Telegraph Company	Rush Creek Bridge (Trinity County)	Julian Wilke - Architect	Mistletoe School Addition (Redding) Oroville Shopping Center (Oroville) Wentz Market (Red Bluff) Wentz Market (Willows)

LAND DEVELOPMENT



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LAND DEVELOPMENT

A complete planning and engineering service for land development is maintained. Representation before all governing bodies and State and Federal agencies is available if desired.

Extensive experience has developed a procedure for efficient operations and practical solutions to problems faced by today's land developer. The engineering personnel have broad experience in assessment proceedings under the various bond and assessment acts.

Planning for cities, regions, industrial parks, shopping centers, recreational use, or subdivision is based upon the modern concept of good community and neighborhood design with proper recognition of engineering problems and economics.

PLANNING & INVESTIGATIONS

MASTER LAND USE AND ZONING PLANS
DETAILED DEVELOPMENT PLANNING
FEASIBILITY AND POPULATION REPORTS
SHOPPING CENTER PLANNING
RECREATIONAL PLANNING
INDUSTRIAL PARKS
SOILS AND FOUNDATION REPORTS

DESIGN & CONSTRUCTION SUPERVISION

MUNICIPAL IMPROVEMENTS AND STRUCTURAL DESIGN
LOT GRADING AND PLOT PLANS
SPECIFICATIONS AND CONTRACT DOCUMENTS
QUANTITY AND COST ESTIMATES
RESIDENT INSPECTION

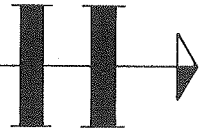
SURVEYING & COMPUTING

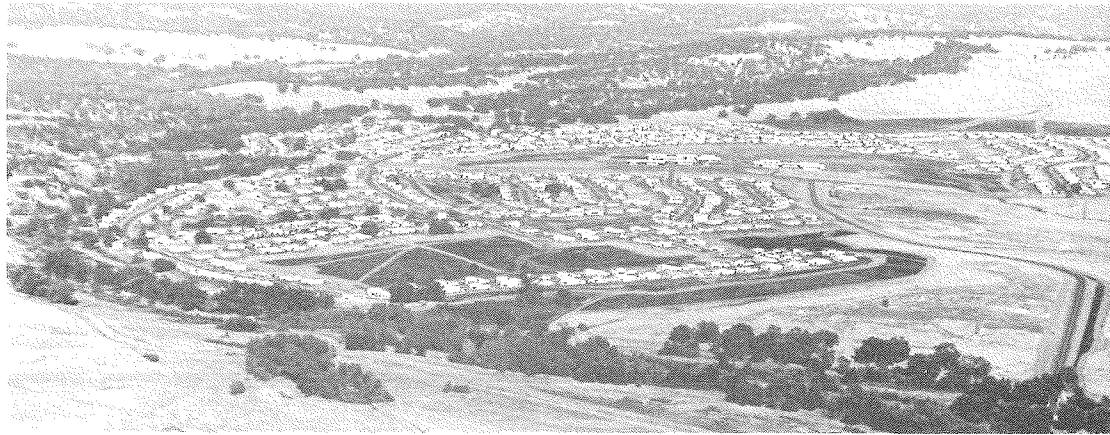
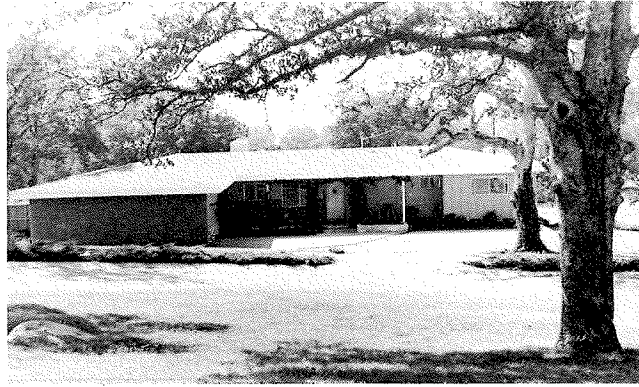
SUBDIVISION PLATS
CONSTRUCTION AND LOT STAKING
BOUNDARY AND TITLE DESCRIPTIONS

APPLICATIONS & CONSULTATION

PLANNING COMMISSIONS AND
PUBLIC AGENCIES
ANNEXATION AND ZONING APPLICATIONS
DIVISION OF REAL ESTATE
F.H.A. AND V.A.
ASSESSMENT DISTRICT PROCEEDINGS
HEALTH DEPARTMENTS AND UTILITY
COMPANIES

REPRESENTATIVE PROJECTS





BEALE AIR FORCE BASE

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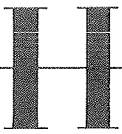
CLIENT: U. S. Air Force

A 1,200 home Capehart Housing Project. Planning and design were required to meet Air Force criteria for airmen's and officer's housing, as well as all F.H.A. requirements, since all loans for project area were insured by F.H.A.

The completed project placed as runnerup in nationwide competition of Capehart projects. The judging was conducted by a special Air Force team appointed by Headquarters U.S.A.F.



LAKWOOD MANOR SUBDIVISION

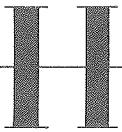


CLIENT: G. S. Smith
Redding, California

A riverside development of 80 lots. Creation of the centrally located lake in which all lots have an undivided interest provided the necessary fill to bring all lots to an elevation acceptable to F.H.A. and the Army Engineers, as well as a unique and desirable recreational facility. The lake is connected to the Sacramento River by channel. The boat underpass is 13' x 15' C.M.P. arch. Improvements were installed under assessment district proceedings.



WESTWOOD MANOR SUBDIVISION

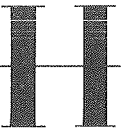


CLIENT: L. S. Gore and Sons
Redding, California

Ultimate development of the initial phase of Westwood Manor will result in construction of approximately 500 homes, a grammar school and neighborhood commercial area.

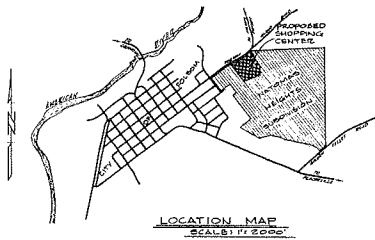
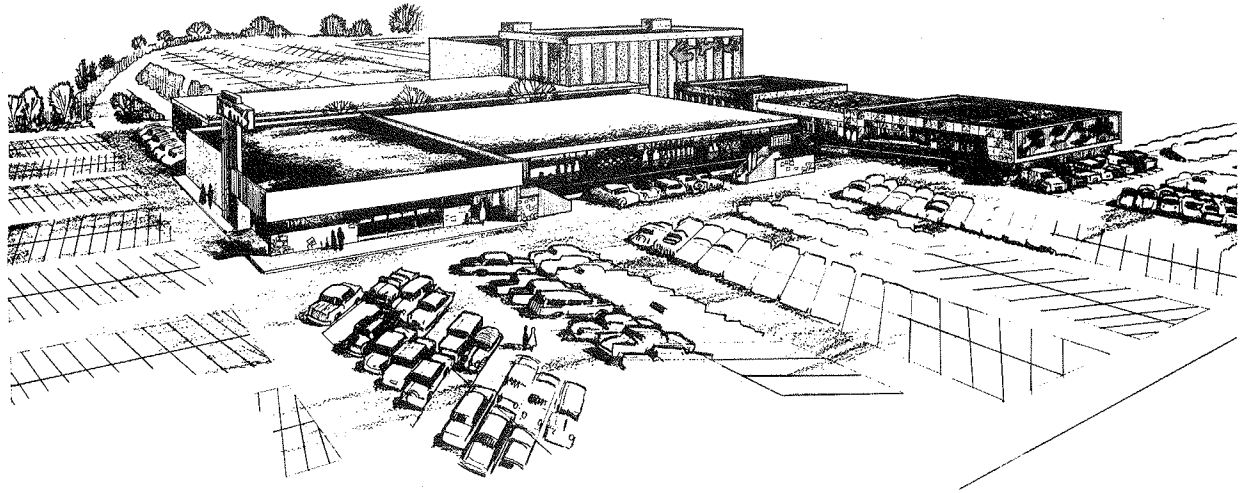


NATOMAS HEIGHTS DEVELOPMENT



CLIENT: Beresa Inc.
Chico, California

This development is located in Folsom, California. It includes construction of 1,000 homes, including multiple family. The plan provides for hospital, shopping center, school sites, church sites, and professional offices.



NATOMAS HEIGHTS SHOPPING CENTER



CLIENT: Folsom Development Association
Folsom, California

A new approach to the shopping center concept. The upper deck "sidewalks" served by escalators separates foot traffic and auto traffic. Except for the drive-in bank, the merchandising areas are above the parking area, enabling passing traffic to see display windows and shopper activity.

PARTIAL LIST OF CLIENTS & PROJECTS

Client	Project	Location
Beresa, Inc. (Chico)	Anderson Heights Subdivision Almond Ranch Subdivision Arroyo Park Subdivision Azalea Acres Subdivision Bauer Redwood Manor Subdivision Natomas Heights Subdivision Bidwell Oaks Subdivision Cypress Subdivision Northgate Shopping Center (Design) Sunset Village Subdivision	Anderson Chico Chico Chico Crescent City Folsom Red Bluff Redding Redding Willows
Lincoln Development Company (Lafayette)	Bidwell Manor Subdivision Shasta Meadows Subdivision	Chico Redding
Bestival Company (Red Bluff)	Westdale Subdivision	Red Bluff
L. S. Gore and Sons (Redding)	Westwood Manors Subdivision	Redding
Earl Smith Corporation	Meadow Lane Subdivision	Anderson
Jack Pine (Redding)	Redding Industrial Park	Redding
Winton Lumber Co. (Martell)	Master Plan for Sly Park	Placerville
Folsom Development Association (Folsom)	Alice Wild Subdivision Folsom Shopping Center	Folsom Folsom
Total projects designed by this firm would accommodate a city of 60,000 people.		

SANITARY ENGINEERING



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SANITARY ENGINEERING

All communities, large and small, face the problem of supplying adequate quantities of clean, potable water and then safely disposing of the wasted water.

The field of Sanitary Engineering, both in water supply and waste water treatment, thus serves an important part in the development of any community.

Throughout the history of Clair A. Hill & Associates, the firm has served cities and unincorporated areas by providing specialized service in the Sanitary Engineering field. Numerous projects have been successfully completed, ranging from small local improvements to major water supply and waste treatment facilities. Experience in all phases of sewage, water supply and storm drainage projects is available from the staff of trained professional engineers.

Preliminary investigations and design, project feasibility, and financial consideration are all carefully prepared prior to project design. Topographic maps, prepared by this firm, are used on most projects to assure the client of the most economical selection of routes for sewers and collection systems. Complete engineering services including design, plans and specifications, construction inspection, and surveys are provided. The staff has extensive experience in the preparation of assessment proceedings for local improvement districts. The use of electronic computing equipment to increase the speed and maintain accuracy in preparing assessment rolls has been a practice of the firm for several years.

INVESTIGATIONS & REPORTS

PRELIMINARY PROJECT REQUIREMENTS
RESEARCH AND DEVELOPMENT
ALTERNATE SYSTEM STUDIES
FINANCIAL CONSIDERATION
TOPOGRAPHIC MAPPING
PRELIMINARY DESIGN
PROJECT FEASIBILITY

DESIGN & CONSTRUCTION SUPERVISION

SEWER SYSTEMS
SEWAGE TREATMENT PLANTS
WASTE WATER DISPOSAL & WATER RECLAMATION
WATER SUPPLY & STORAGE
WATER TREATMENT PLANTS
WATER DISTRIBUTION SYSTEMS
PUMPING STATIONS & TRANSMISSION MAINS
STORM DRAINAGE SYSTEMS

SPECIAL SERVICES

ASSESSMENT DISTRICT PROCEEDINGS
JOINT PROJECT DEVELOPMENT
GOVERNMENT GRANTS & APPLICATIONS
OPERATIONAL & MANAGEMENT ASSISTANCE

REPRESENTATIVE PROJECTS





Hangtown Creek Trunk Sewer

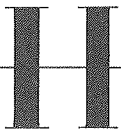
Note cast iron pipe supported by concrete piers and curved alignment.



Hangtown Creek Trunk Sewer

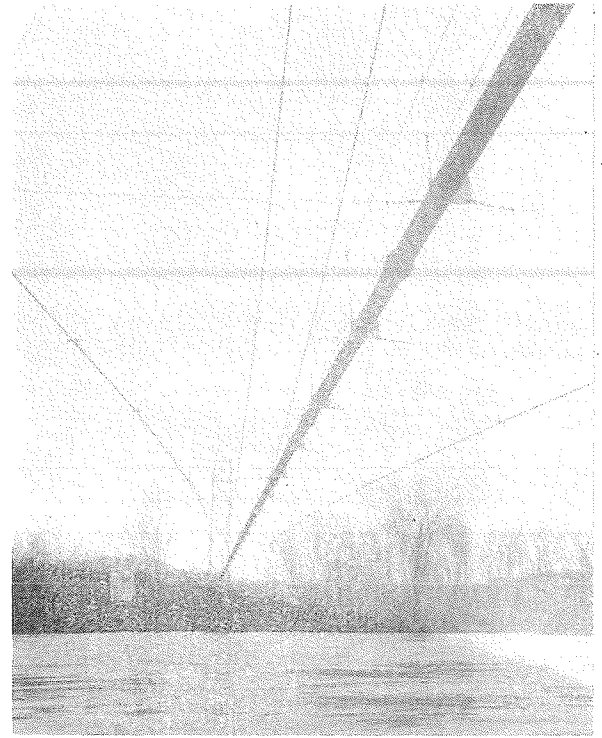
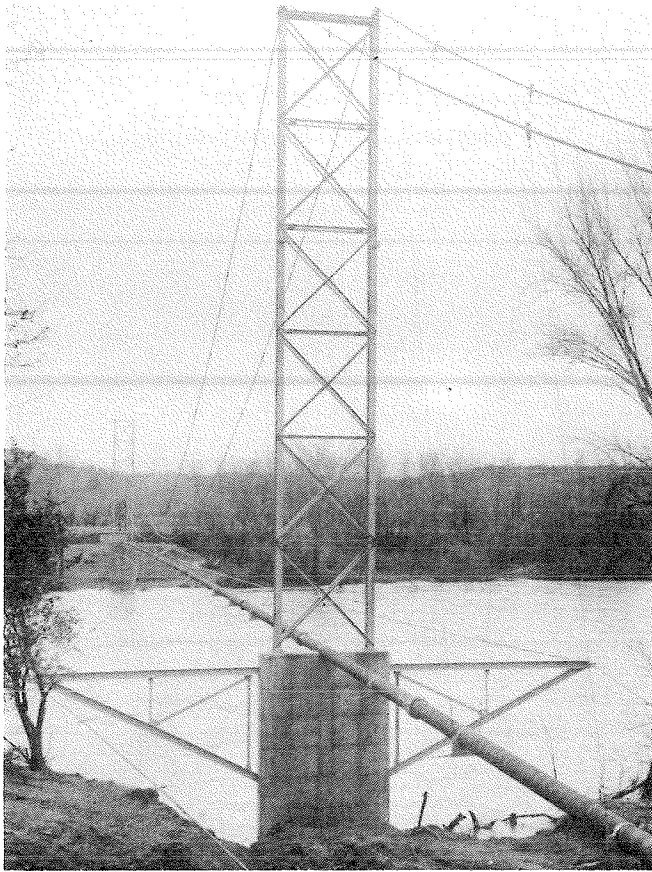
Note proximity of railroad and highway.

COLLECTION SYSTEM & TRUNK SEWERS



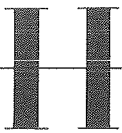
CLIENT: City of Placerville
El Dorado County, California

Part of the program to improve the sewerage system included construction of approximately 5,000 feet of 6, 8 and 10-inch collector sewers and 18,000 feet of trunk sewer 12 to 20 inches in diameter. The trunk sewer extends from the City to the new treatment plant located on Hangtown Creek. Many design problems were encountered due to the very rugged terrain and limited access. Portions of the trunk sewer were constructed in Hangtown Creek by using cast iron or steel pipe on concrete piers. This design proved to be most economical and satisfactory. The construction cost for these sewers was \$319,000.



Sacramento River Crossing

TRUNK SEWERS & STRUCTURES

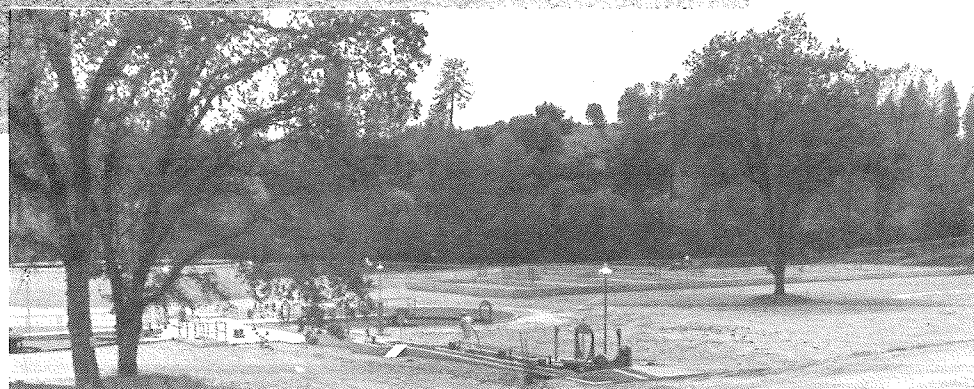
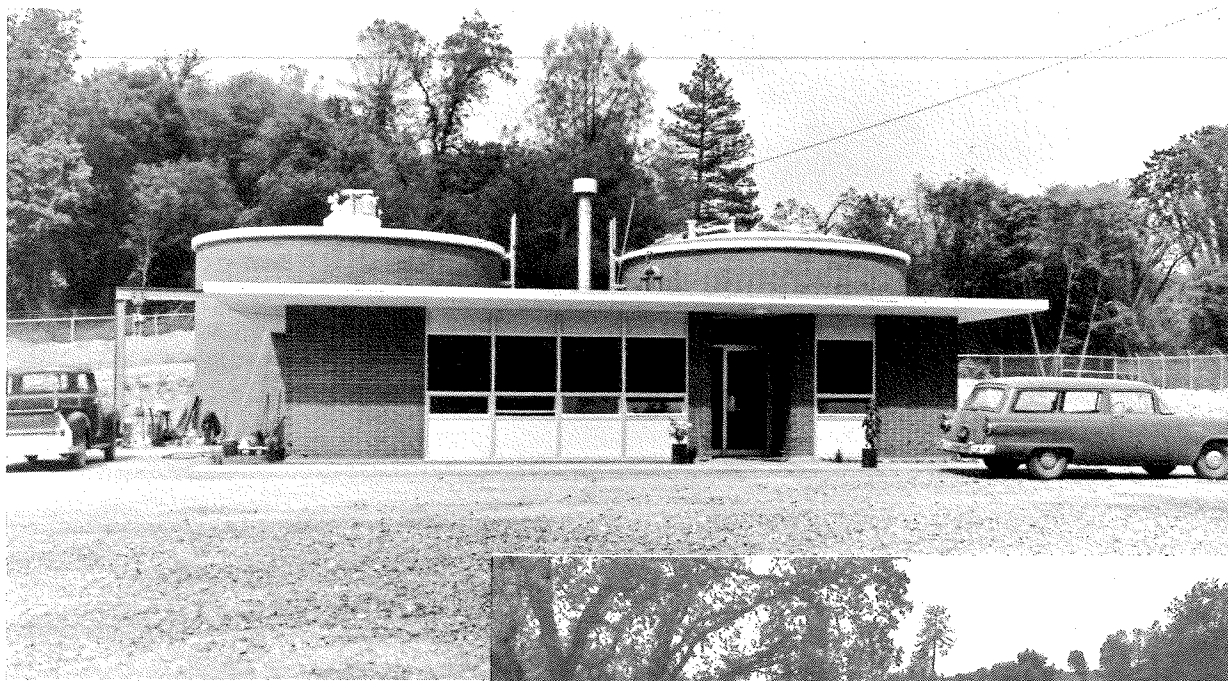


CLIENT: City of Redding
Shasta County, California

As a part of the Master Plan for sanitary sewerage, the north and west Redding trunk sewers and structures were completed to serve new areas and relieve overloaded sewers in the original City system.

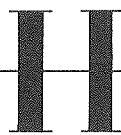
The construction included 18,000 feet of trunk sewer from 30" to 12" in diameter and two major pumping stations. An interesting part of the project was to construct a sewer across the Sacramento River. The problem was solved by designing a suspension bridge to support a pressure sewer. The bridge spans 460 feet between towers and is located just downstream from the present Highway 99 bridge.

The project was completed at a construction cost of \$440,000.



Primary and Secondary Clairifiers

SEWAGE TREATMENT PLANT



CLIENT: City of Placerville
El Dorado County, California

The City of Placerville, located in the Mother Lode Country, is experiencing steady population growth. As a result, existing sewage treatment facilities were sorely in need of replacement. During 1961, Clair A. Hill & Associates prepared an engineering report outlining the needs of the City of both sewerage and water systems. As a result of the program outlined by the report, a new sewage treatment plant was designed and constructed along Hangtown Creek. The new plant provides treatment capacity sufficient for the City and surrounding area and is of modern design. The plant is located to provide excellent isolation and encompasses both primary treatment and secondary treatment of sewage wastes. The construction cost was \$334,000 and provided a plant with initial capacity of 2.0 mgd readily expandable to twice the initial size.

The engineering firm of Cornell, Howland, Hayes and Merryfield, of Corvallis, Oregon, was associated with this firm during the design of the project.

PARTIAL LIST OF CLIENTS & PROJECTS

Sewerage Systems – Design & Reports		Water Systems – Design & Reports		Storm Drainage – Design & Reports	
Client	Project	Client	Project	Client	Project
City of Redding	North and West Redding Trunk Sewers and Structures	City of Redding	Sacramento River Pump Station and Transmission Mains	City of Santa Cruz	Report on the Collection and Disposal of Storm Drainage
	Collection Systems and Trunk Sewers (Redding Heights, Dakyn Addition, Park—Boardman)	City of Red Bluff	Master Plan and Report concerning Water Supply Storage and Distribution; Water Supply Improvements; Reservoirs and Transmission Mains	City of Redding	Study concerning Storm Drainage Runoff Within the City and Tributary Areas
	Modifications to Treatment Plant			Shasta County Water Agency	Churn Creek Drainage Study
	Master Sewer Plan	City of Santa Cruz	Reservoir and Transmission Mains	City of Folsom	Master Plan for Storm Drainage and Street Improvements
	1963 Sewage Treatment Study	United States Air Force	Water Supply Storage and Distribution – Beale Air Force Base Housing Area	United States Air Force	Storm Drainage System – Family Housing Area, Beale Air Force Base
County of Shasta	South-Central Urban Area Sewerage Study	Enterprise Public Utility District	Water Supply, Storage, and Distribution System; Wells and Transmission Mains; Additions to Distribution Systems; Report concerning Future Water Supply and Treatment		
	Anderson Sewerage System				
	Shasta County Hospital Sewerage System				
City of Folsom	Anderson Heights Trunk Sewer	Shasta County Water Agency	Report concerning the Trinity Project as a Water Source for the Redding Area		
	Wool Street Trunk Sewer Sewage Treatment Study				
City of Placerville	Report concerning Improvements to Sewer System	Calaveras Public Utility District	Report on Water System Improvements		
	Sewage Treatment Plant Sewer System Extensions and Trunk Sewers	City of Placerville	San Andreas Transmission Mains		
City of Greenville			Report concerning Proposed Improvements to Water System		
	Sewer System and Treatment Plant	Cascade Community Services District	Report on Alternate Water Sources; Report on Proposed Water System; Water System Design		
United States Air Force	Collection System and Trunk Sewers – Beale Air Force Base Housing Area				
Enterprise Public Utility District	Collection System; Trunk Sewers and Treatment Plant				
South Tahoe Public Utility District	Collection Systems and Trunk Sewers: Six Projects				
	Pumping Stations: Three Projects				
	Effluent Disposal Studies and Reports				
	Effluent Disposal Facilities				
	Preliminary Studies and Report on Advanced Waste Treatment Methods				
	Design of Water Reclamation Plant				
	Preliminary Report concerning Exportation of Reclaimed Water				

HIGHWAY & BRIDGE ENGINEERING



H

HIGHWAY ENGINEERING

The staff can prepare traffic and route studies, reconnaissance and preliminary route surveys, final designs and plans and specifications; provide location and construction surveys, and construction engineering and inspection services. Such related facilities as grade separation structures, bridges, culverts, and other drainage structures; lighting and utility relocations may be included.

In addition to the extensive experience in the design of typical street, highway, and bridge projects, the staff has had exceptional experience in route location and design of mountain and forest access roads in remote and extremely difficult terrain. Basin studies to determine runoff for design of bridge and drainage structures, foundation studies and recommendations, and modern techniques and equipment for photogrammetric mapping are a few of the related services available which provide proper scheduling and early completion of each project.

INVESTIGATIONS & REPORTS

TRAFFIC STUDIES

- Street & Highway Inventory & Classification
- Traffic Count & Classification
- Capacity Determinations
- Flow Maps
- Projected Traffic Volumes
- Origin-Destination Surveys

ROUTE STUDIES

DRAINAGE STUDIES

SOILS & FOUNDATION REPORTS

SURVEYING, MAPPING, & COMPUTING

PHOTOGRAMMETRY

TOPOGRAPHIC MAPPING

PRELIMINARY SURVEYS

PROFILE & CROSS-SECTIONS

EARTHWORK COMPUTATIONS

LOCATION SURVEYS

CONSTRUCTION STAKING

DESIGN & CONSTRUCTION SUPERVISION

STREETS, HIGHWAYS, & PAVEMENTS

MOUNTAIN & FOREST ROADS

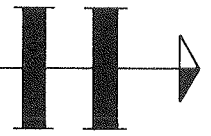
DRAINAGE, INCLUDING BRIDGES, CULVERTS,

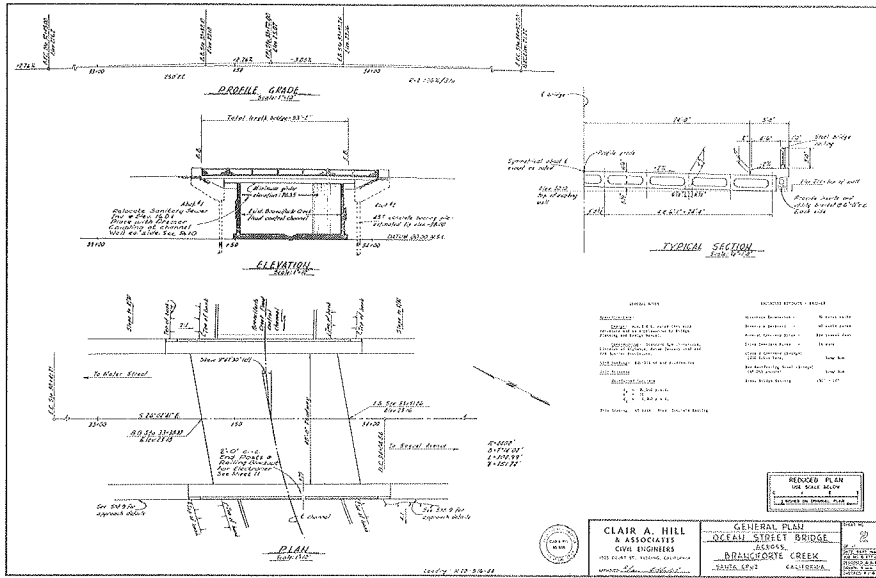
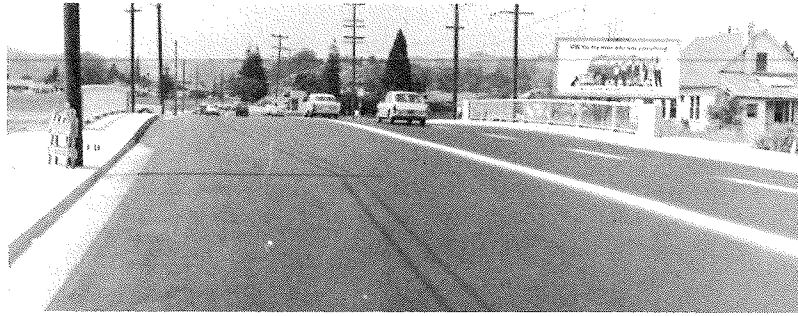
& OTHER DRAINAGE STRUCTURES

GRADE SEPARATION STRUCTURES

RETAINING WALLS OR CRIBBING

REPRESENTATIVE PROJECTS





OCEAN STREET AT BRANCIFORTE CREEK

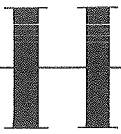
CLIENT: Department of Public Works
Santa Cruz, California

Reconstruction of a major city street necessitated by the relocation of Branciforte Creek by the Corps of Engineers in conjunction with the San Lorenzo River Flood Control Project. An increased design flood stage requiring street grades well above the adjoining property and conflicts with existing utilities were among the problems resolved.

The project consisted of 800 feet of street, curb, gutter, and sidewalk improvements; storm drainage, relocation of existing water, sewer, gas, electric and telephone utilities; and street lighting. Design; preparation of plans, specifications and estimates; liaison with the various State and Federal agencies; and construction supervision were among the services provided.



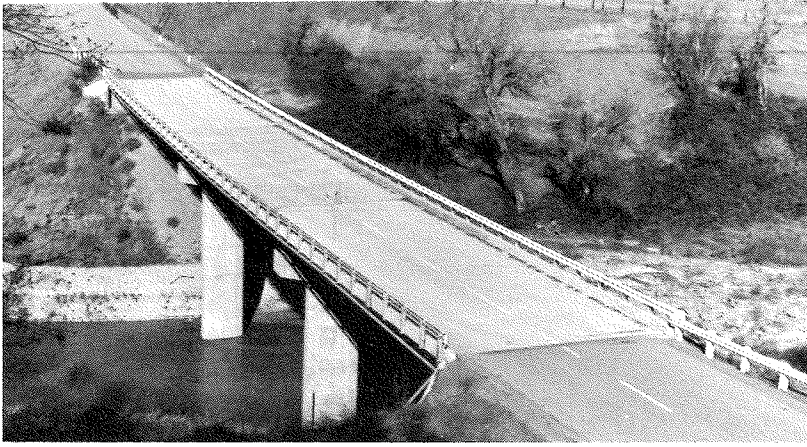
ICE HOUSE ROAD



CLIENT: El Dorado National Forest
U. S. Forest Service, Department of Agriculture
El Dorado County, California

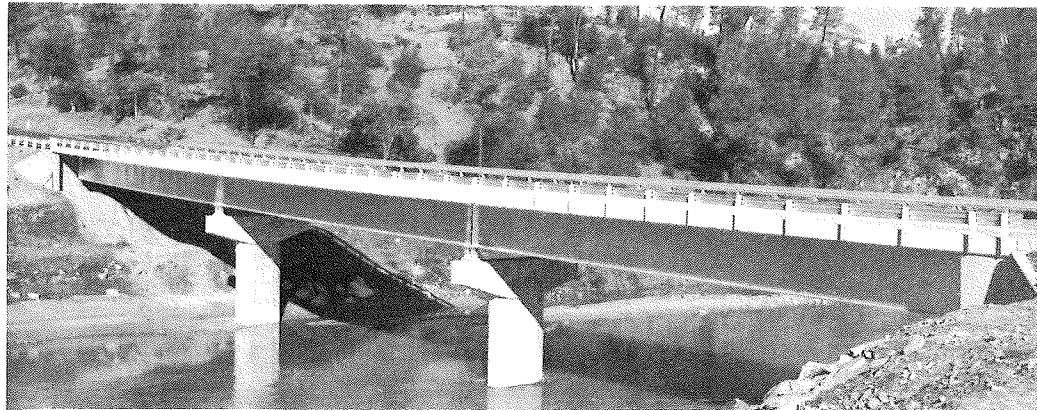
Approximately 12 miles of new construction on Primary access route to large recreational area and to extensive National Forest resources. Also provides access to major reservoirs of the Sacramento Municipal Utility District's Upper American River Development. Route is part of major forest route to serve western slope of High Sierra between U. S. Highways 40 and 50.

Services included location surveys, design, and preparation of plans.



Cottonwood Creek Bridge

Clear Creek Bridge



CLEAR CREEK & COTTONWOOD CREEK BRIDGES

CLIENT: Shasta County Department of Public Works
Shasta County, California

Two composite steel and concrete structures located on a Federal Aid Secondary route serving western Shasta County. Part of a construction program to improve the County's transportation network. Structures were constructed in conjunction with major road improvements in two contracts in 1954 and 1955. Preliminary studies, design, preparation of plans and preliminary report, and coordination with the State of California Division of Highways were among the services performed.



NORTH FORK SMITH RIVER BRIDGE



CLIENT: Del Norte County Road Department
Del Norte County, California

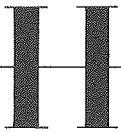
Contrast between the new and the old is depicted by these structures on a Del Norte County Federal Aid Secondary Route. The bridge is a two-lane, composite steel girder and concrete structure supported on circular columns and spread footings. Steep rugged terrain of the Middle Fork of the Smith River and location of U.S. 199 necessitated the horizontal curvature and steep gradients. Services included preliminary studies, design, preparation of plans and preliminary report, and coordination with the State of California Division of Highways.

STONY CREEK BRIDGE



Tehama County Road P - 86.

BLACK BUTTE PROJECT - COUNTY ROAD RELOCATIONS



CLIENT: U. S. Army Corps of Engineers
Sacramento District

Relocation of existing County roads necessitated by the construction of the Black Butte Dam and Reservoir on Stony Creek in Glenn and Tehama Counties. Thirteen miles of new road construction and all drainage facilities, including three minor and three major bridges. Total cost, \$750,000.

Services included preliminary reconnaissance and route location surveys, final design, preparation of plans, specifications and control estimates, and the final location surveys.

PARTIAL LIST OF CLIENTS & PROJECTS

Clients	Projects
Department of Agriculture, U. S. Forest Service Shasta-Trinity National Forests Plumas National Forest El Dorado National Forest Mendocino National Forest	Hirz Bay Road Soldier Creek Road Packers Gulch Road Corral Bottom Road Mosquito Creek Road Ice House Road
U. S. Army Corps of Engineers, Sacramento District	Black Butte Project Tehama County Road Relocations Glenn County Access Road Missile Site Access Roads
U. S. Air Force	Capehart Access Roads Beale Air Base
Del Norte County	Elk Valley Road
Butte County	Gridley-Colusa Highway
City of Redding	Overhill Drive
City of Chico	Pine-Cypress Project
City of Santa Cruz	Ocean Street Project
Pacific Gas & Electric Company	McCloud-Pit Project Access Roads
McCreary • Koretsky • Engineers	Placer County Water Agency Middle Fork American River Project Access Roads

WATER RESOURCES ENGINEERING



H

WATER RESOURCES ENGINEERING

Personnel of the firm with specialized experience in the field of Water Resources can provide all services necessary for the planning, surveys design, and construction of water storage, conveyance and distribution projects as well as hydroelectric and flood control projects. Members of the staff have participated in a number of major water and hydroelectric projects.

Experienced personnel are available for assistance in the negotiation of contracts for water service, loans, etc., with governmental and other agencies. Included in this category are services for work associated with water rights applications, settlement of water rights disputes, and the obtaining of State water rights and Federal power permits.

INVESTIGATIONS

RECONNAISSANCE STUDIES
FEASIBILITY STUDIES
GROUNDWATER
GEOLOGY
HYDROLOGY
FLOOD ROUTING
DRAINAGE
LAND CLASSIFICATION
IRRIGATION WATER MANAGEMENT
CROP MAPPING

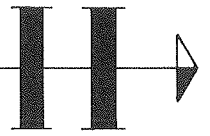
DESIGN & CONSTRUCTION SUPERVISION

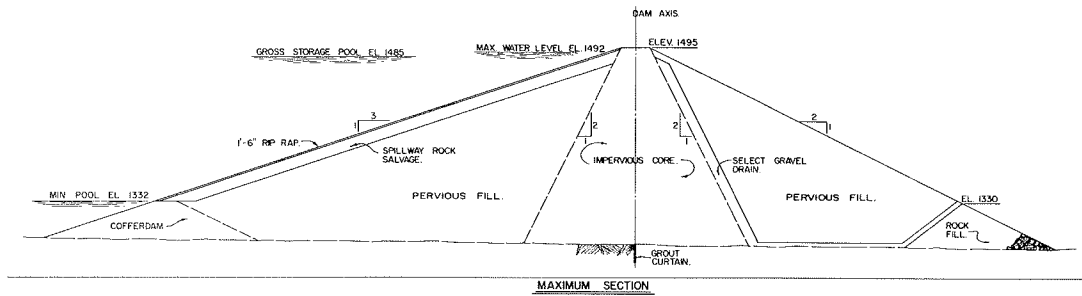
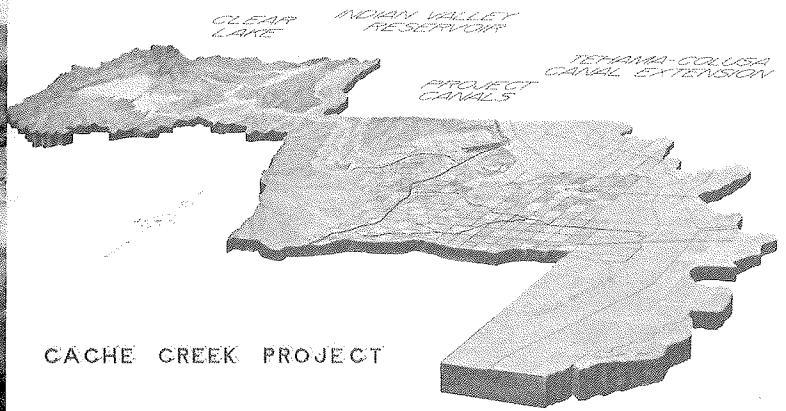
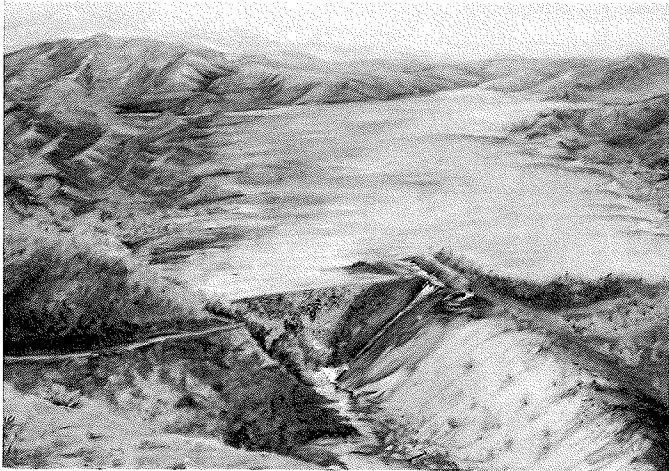
DAMS
TUNNELS
POWER PLANTS
PUMP PLANTS
CANALS AND CONTROL STRUCTURES
DISTRIBUTION LATERALS
MEASURING & TELEMETERING EQUIPMENT
WELLS

WATER RIGHTS

APPLICATIONS
INVESTIGATIONS re: DISPUTES
LITIGATION

REPRESENTATIVE PROJECTS



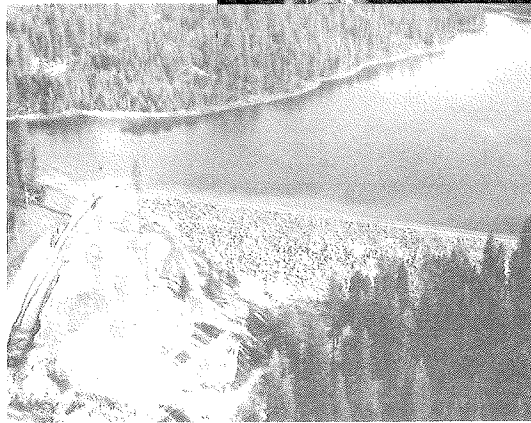
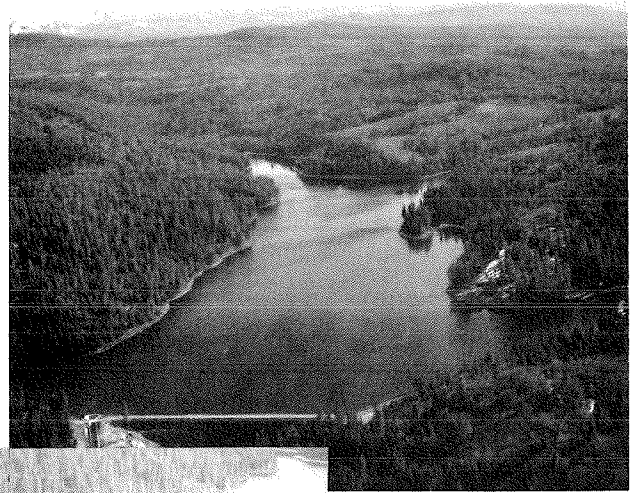
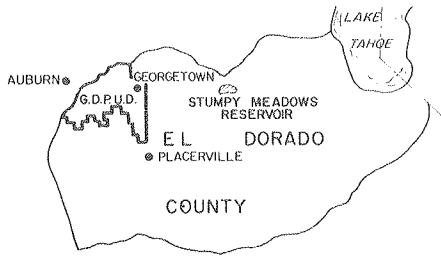


CACHE CREEK PROJECT

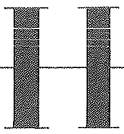


CLIENT: Yolo County Flood Control and Water Conservation District
Yolo County, California

A \$12,000,000 project consisting of acquisition of a private water company distribution system, construction of a 300,000 acre-foot dam and reservoir for flood control and conservation and the construction of new diversion and conveyance works, pumping plants, and distribution systems. Conjunctive groundwater operation for most economic use of water resources available to the area is contemplated with aid of a groundwater pumper's charge.

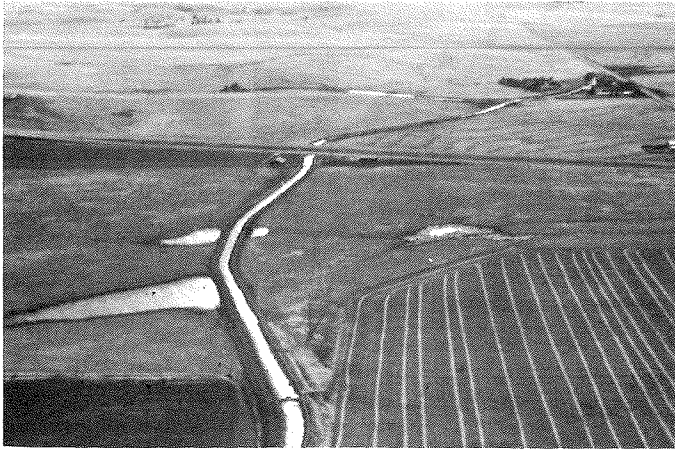


STUMPY MEADOWS PROJECT

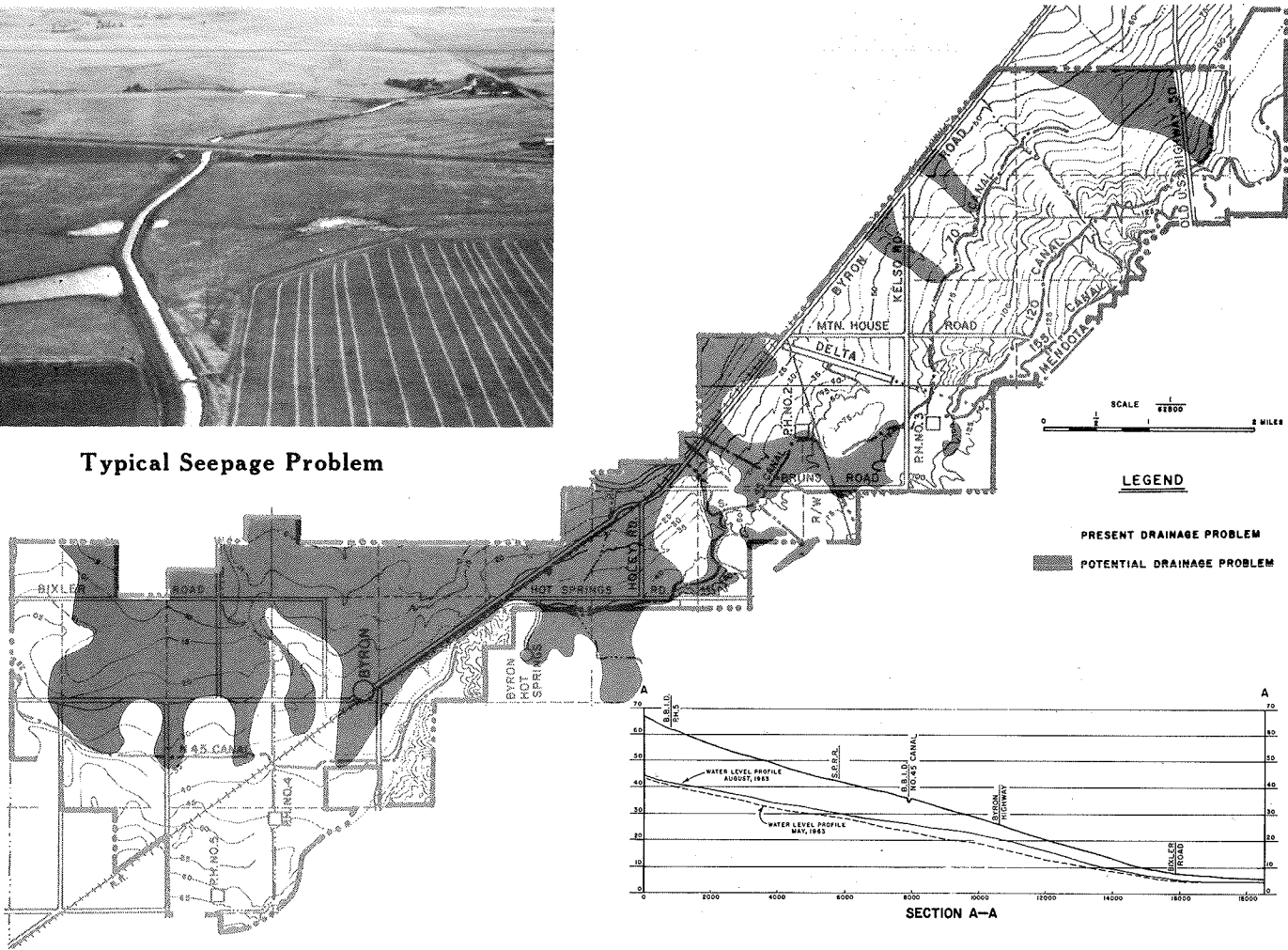


CLIENT: Georgetown Divide Public Utility District
El Dorado County, California

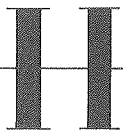
A \$5,000,000 project financed with P. L. 984 funds consisting of a dam and reservoir, about 11 miles of ditch, tunnel, and pipe to provide irrigation and domestic water to the Georgetown Divide area. Except for some pipeline work under construction, the project is complete and in operation.



Typical Seepage Problem



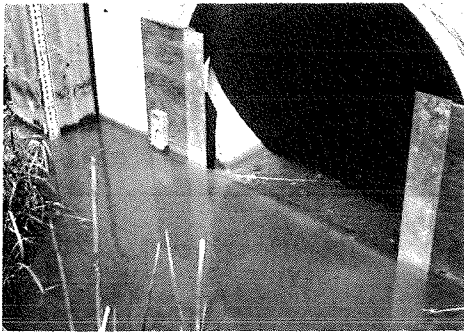
IRRIGATION & DRAINAGE PLANS



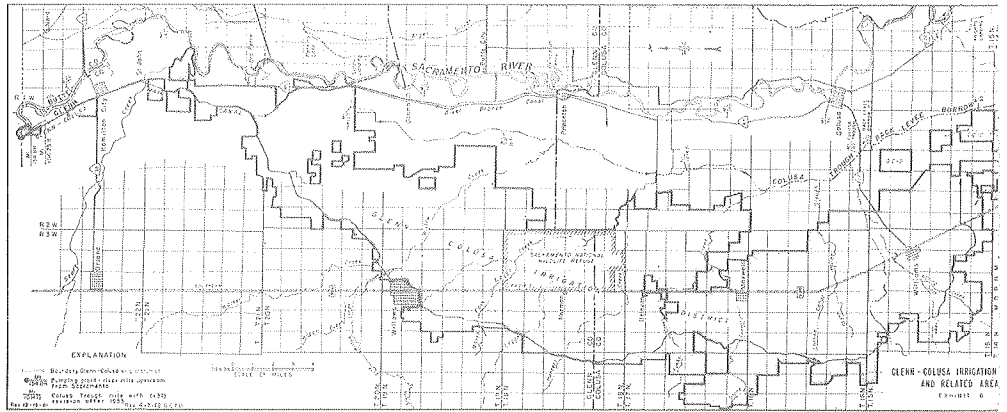
CLIENT: Byron-Bethany Irrigation District
Byron, California

Feasibility study in conformance with P. L. 984 in support of a Federal loan for extensive rehabilitation of 40-year old pump, conveyance, and distribution system, serving approximately 13,000 irrigable acres. Estimated cost of improvements is \$1,600,000.

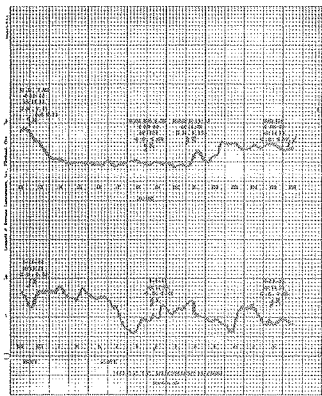
Extensive studies are included to provide most economic means of providing seriously deficient drainage facilities.



Recorder and Weir

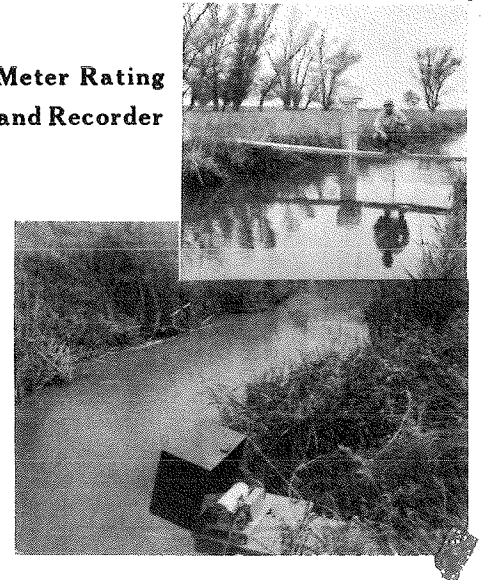


**Recorder and Weir
in Farmer's Tailbox**

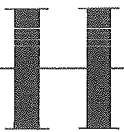


Recorder Chart

**Current Meter Rating
Section and Recorder**

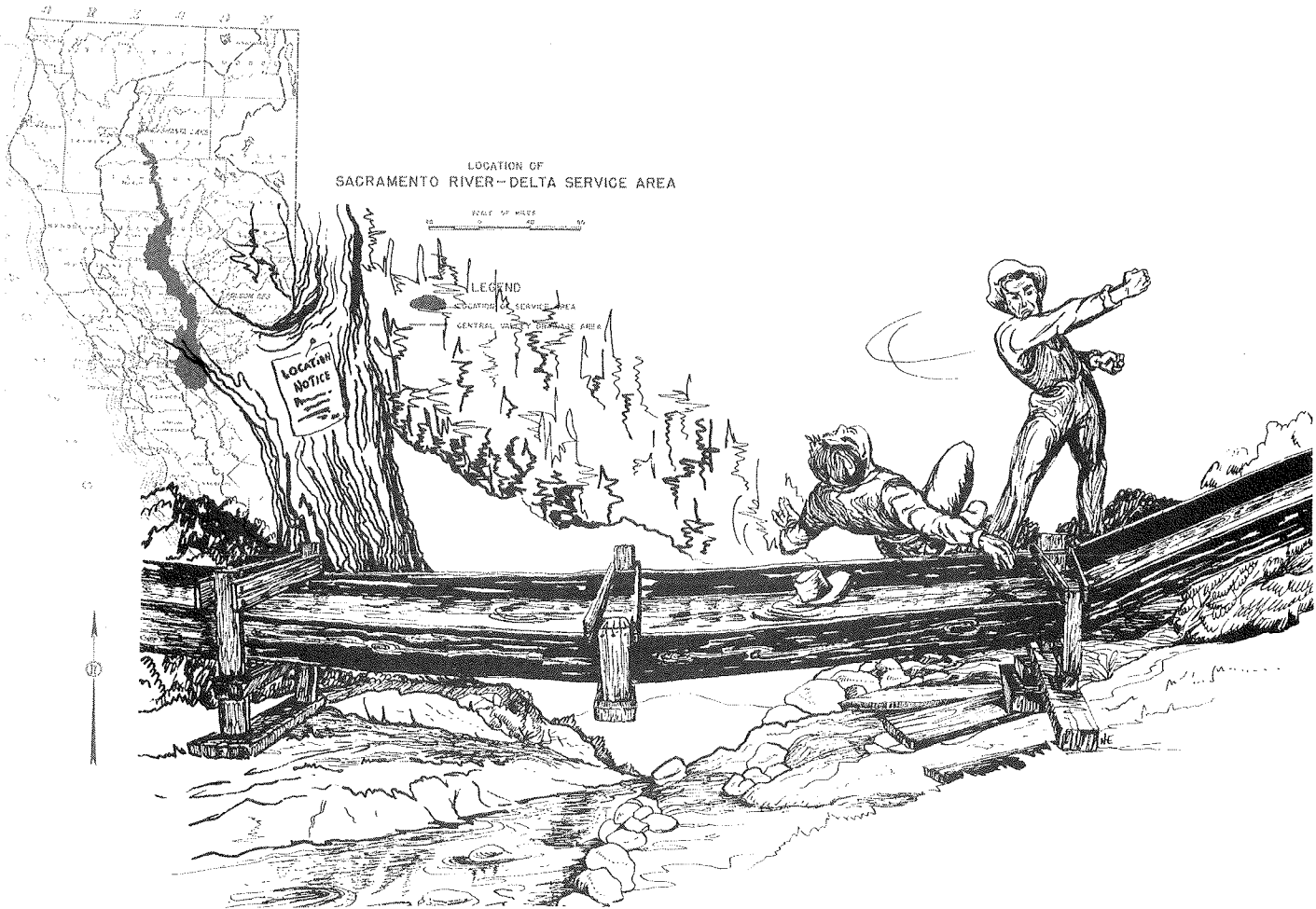


WATER MEASUREMENT PROGRAM



CLIENT: Glenn-Colusa Irrigation District
Glenn and Colusa Counties, California

An extensive program of measuring canal, drain, and specific rice field input—output flows for the determination of irrigation efficiencies and methods of improving water flow management throughout the District. Total acreage of District is about 160,000 acres, about 100,000 of which are presently irrigated. The total water requirement of the District is about 800,000 acre-feet per season. The study was made for two full seasons on an extensive basis, continuing on a modest basis for an undetermined time.



SACRAMENTO RIVER WATER RIGHTS

II

CLIENTS: Glenn-Colusa Irrigation District
Provident Irrigation District
Byron-Bethany Irrigation District
Tehama County Flood Control & Water Conservation District
City of Redding

Investigations relating to and representation before State Water Rights Board.

Hearings on U. S. Bureau of Reclamation water rights applications to appropriate water for operation of initial features of Central Valley Project.

Participated in extensive studies and prolonged negotiations for settlement of disputes between U. S. and water users as to natural flow entitlements. This involved the water in the Sacramento-San Joaquin Delta and its tributaries, particularly the Sacramento River watershed.

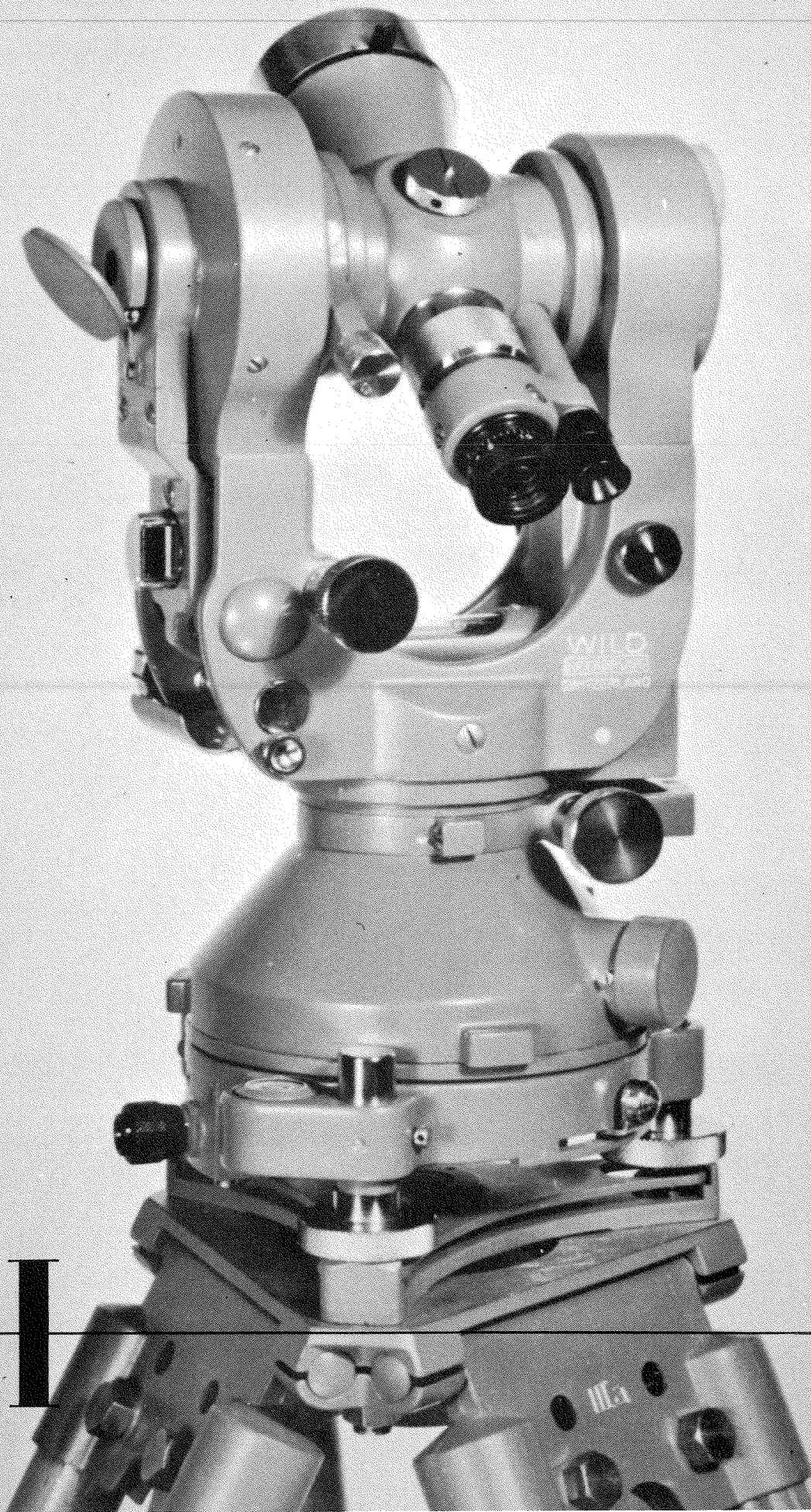
PARTIAL LIST OF CLIENTS & PROJECTS

Client	Project	Status	Construction Cost
Glenn-Colusa Irrigation District	Iron Canyon	Preliminary Studies (abandoned)	\$150,000,000
	Water Measurement Program	Continuing	—
	Water Rights	Completed negotiations for settlement with U. S.	—
Tehama County Flood Control and Water Conservation District	Paskenta	Pending	8,000,000
Georgetown Divide Public Utility District	Stumpy Meadows	Completed	5,000,000
Klamath Basin Improvement District	Klamath Project Extensions	Completed	800,000
Shasta County	Clear Creek Alternates	Completed (Constructed by U. S.)	250,000,000
Yolo County Flood Control and Water Conservation District	Cache Creek	Investigations	12,000,000
Byron-Bethany Irrigation District	Rehabilitation	P. L. 984 Loan Application (Complete)	1,600,000
Calaveras Public Utility District	Alternate Source Development and Rehabilitation	Investigations	1,600,000
El Dorado Irrigation District	Silver Fork	Preliminary Studies	8,000,000
Sacramento County	Folsom South Conjunctive Groundwater Operation	Preliminary Studies	—
Glenn-Colusa Irrigation District Provident Irrigation District Byron-Bethany Irrigation District Calaveras Public Utility District Georgetown Divide Public Utility District Tehama County Flood Control and Water Conservation District City of Redding City of Folsom	Water Rights Investigations and Negotiations		

FEDERAL AND STATE LOAN PROJECTS

Project	Agency	Estimated Cost	Status
Federal P. L. 984			
Stumpy Meadows Project	Georgetown Divide Public Utility District	\$4,200,000	Complete
Stumpy Meadows Supplemental	Georgetown Divide Public Utility District	800,000	Under Construction
Klamath Basin Extensions	Klamath Basin Improvement District	800,000	Complete
Rehabilitation	Byron-Bethany Irrigation District	1,600,000	Under Study
Paskenta Project	Tehama County Flood Control and Water Conservation District	8,000,000	Under Study
State Davis-Grunsky Act			
Stumpy Meadows Project	Georgetown Divide Public Utility District	\$ 300,000 Grant	Complete
Paskenta Project	Tehama County Flood Control and Water Conservation District	3,200,000 Grant & Loan	Pending
Rehabilitation and Storage Project	Calaveras Public Utility District	Loan	Under Study

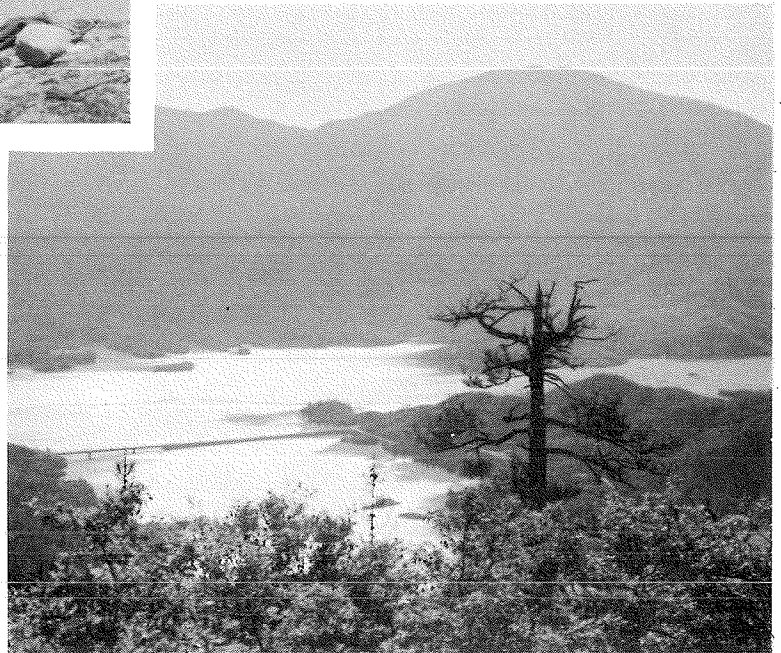
SURVEYING & MAPPING



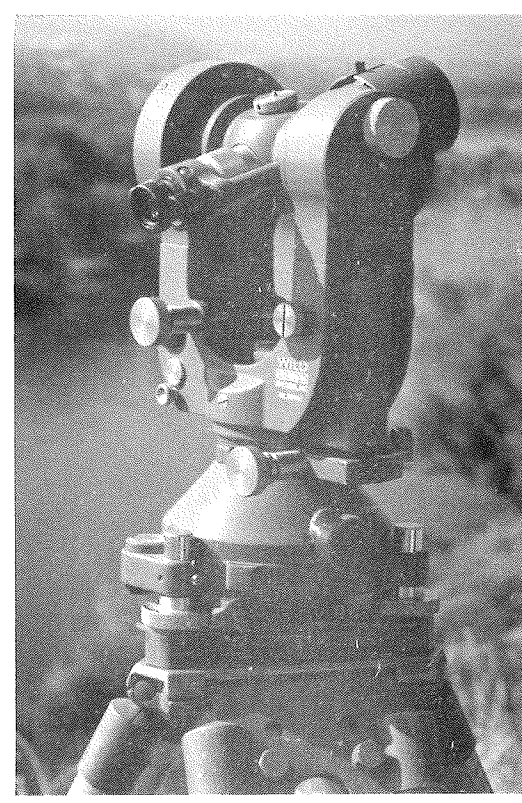
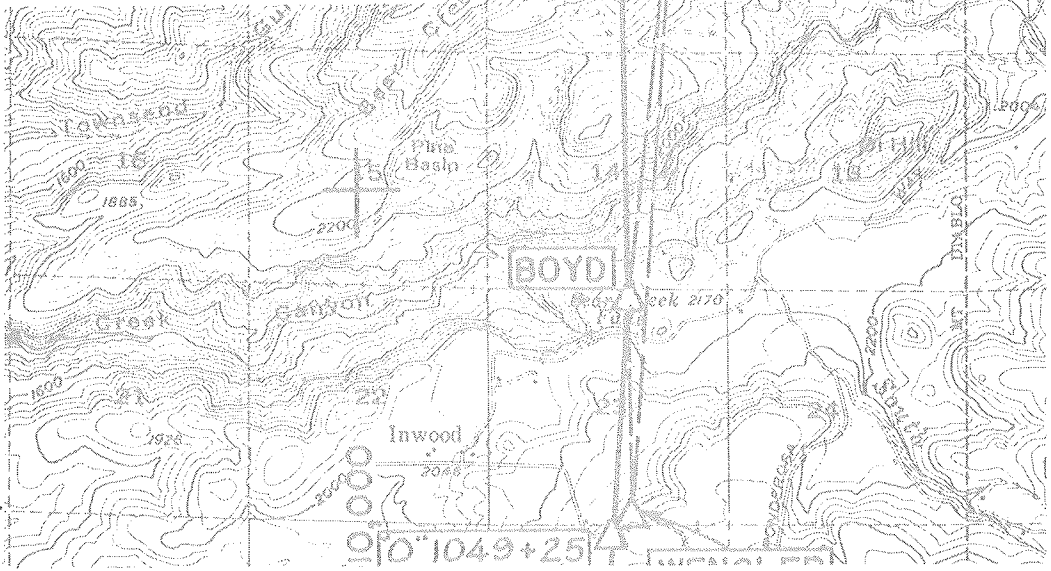
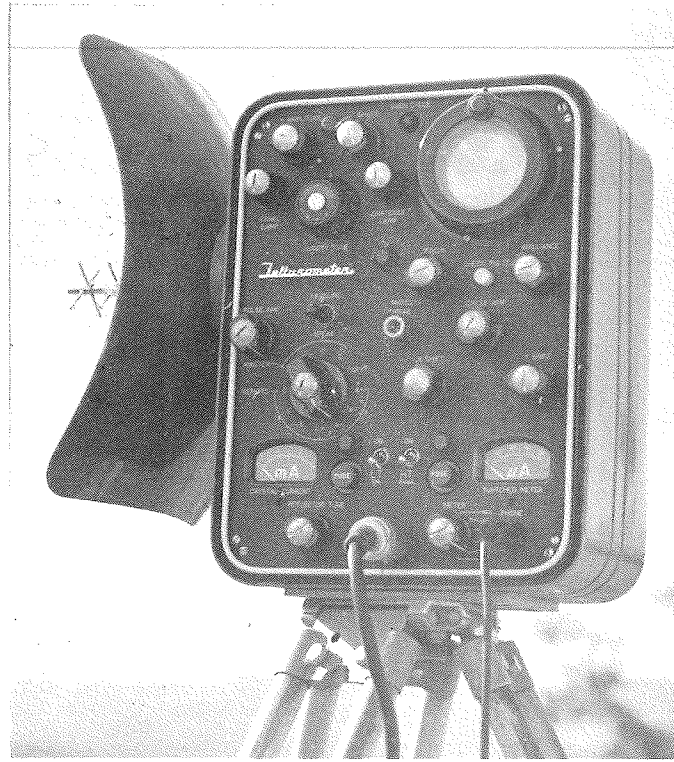
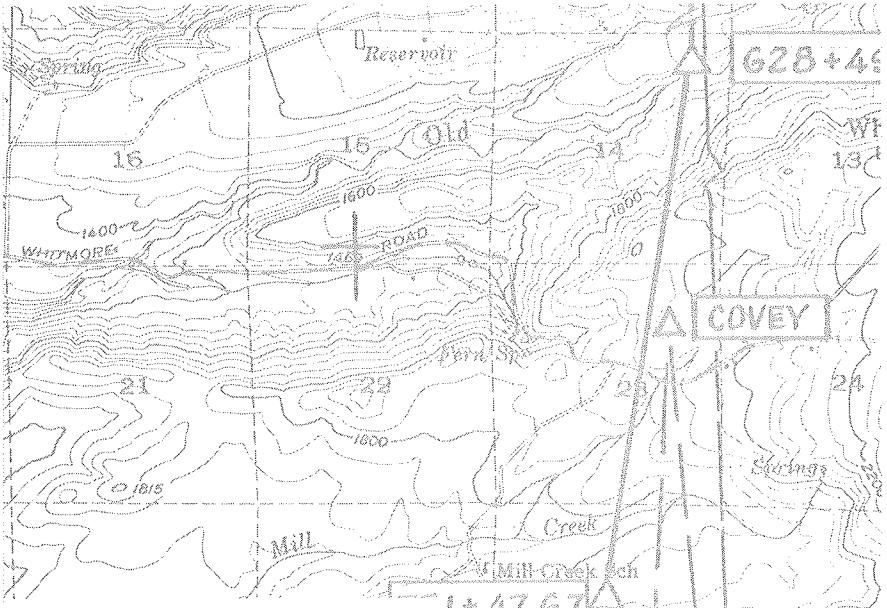
II

SURVEYING & MAPPING

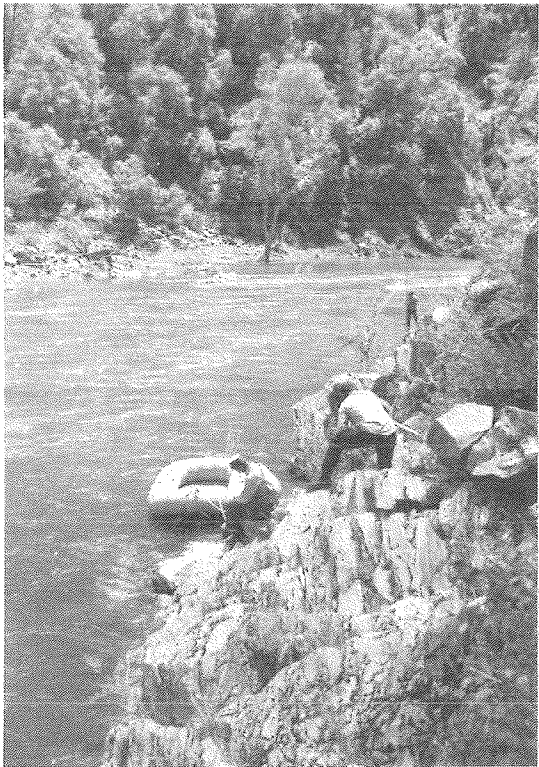
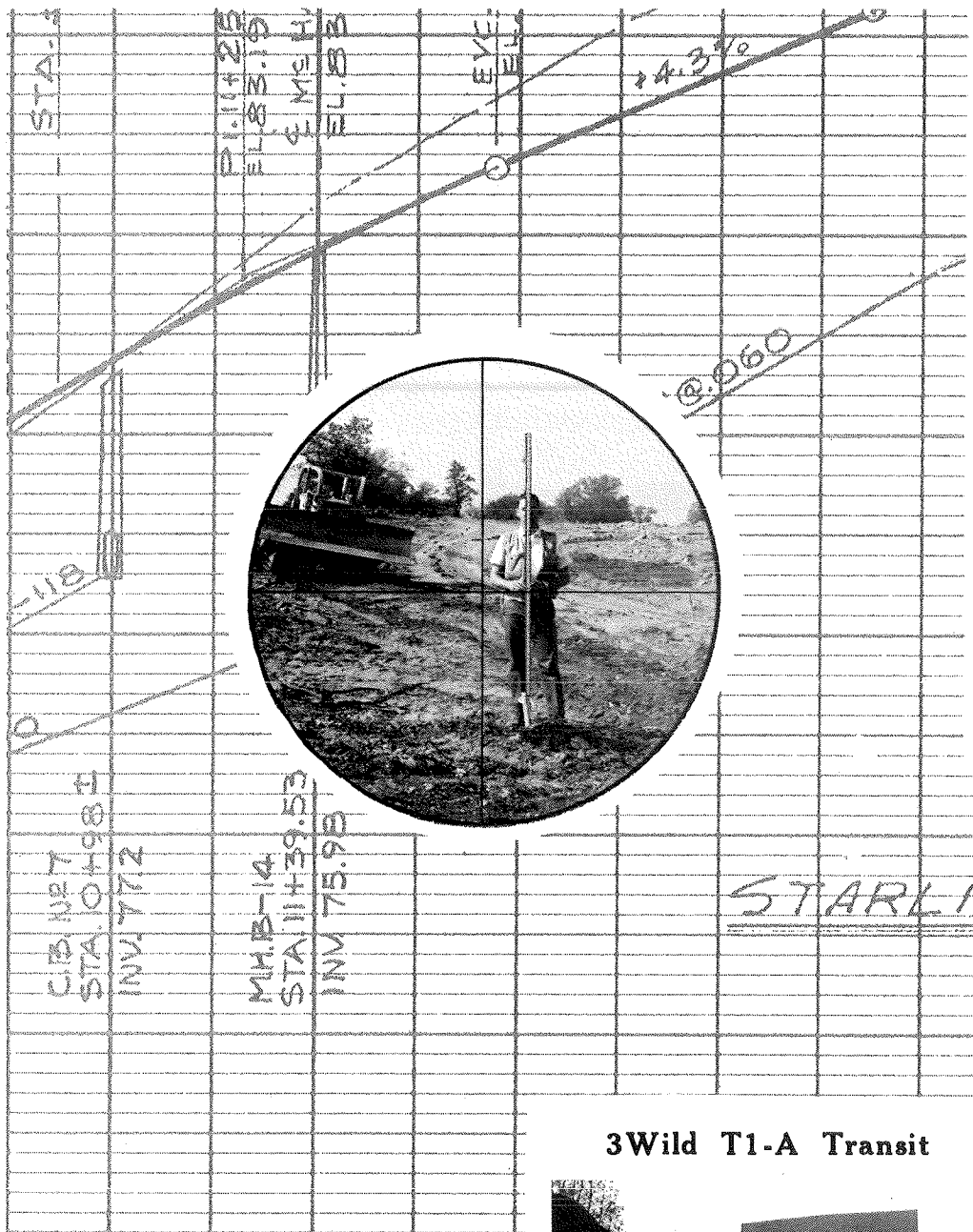
Personnel of the Survey Department are experienced in all phases of surveying, including construction, control, and property surveys. We currently have over 20 crews in the field equipped with the latest in electronic and optical instruments. Complete base camp equipment, including two cook house trailers, bath house trailer and eight bunk house trailers, radio communication equipment, five company-owned airplanes and pack animals, make operations on remote projects feasible.



CONTROL SURVEYS



CONSTRUCTION SURVEYS



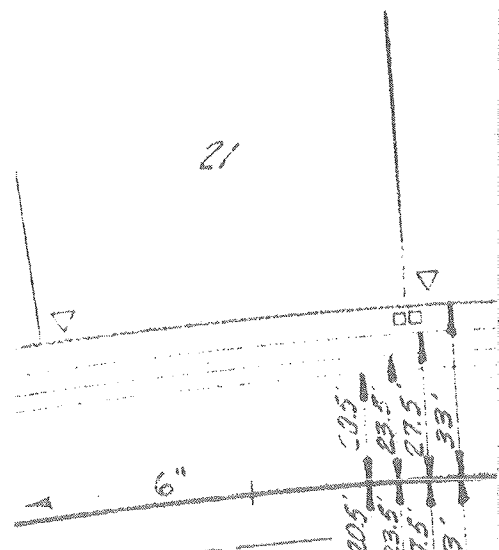
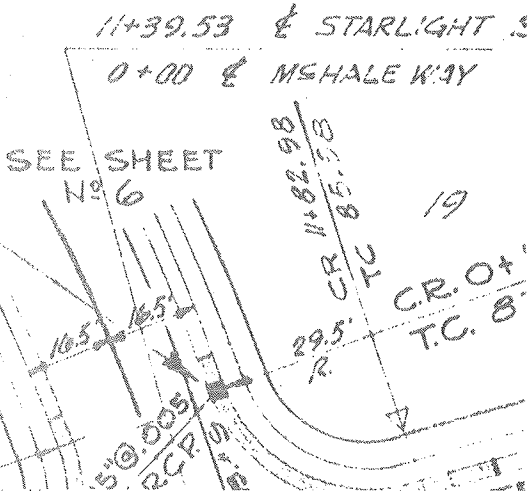
STARLIGHT BLVD

3Wild T1-A Transit



11+00

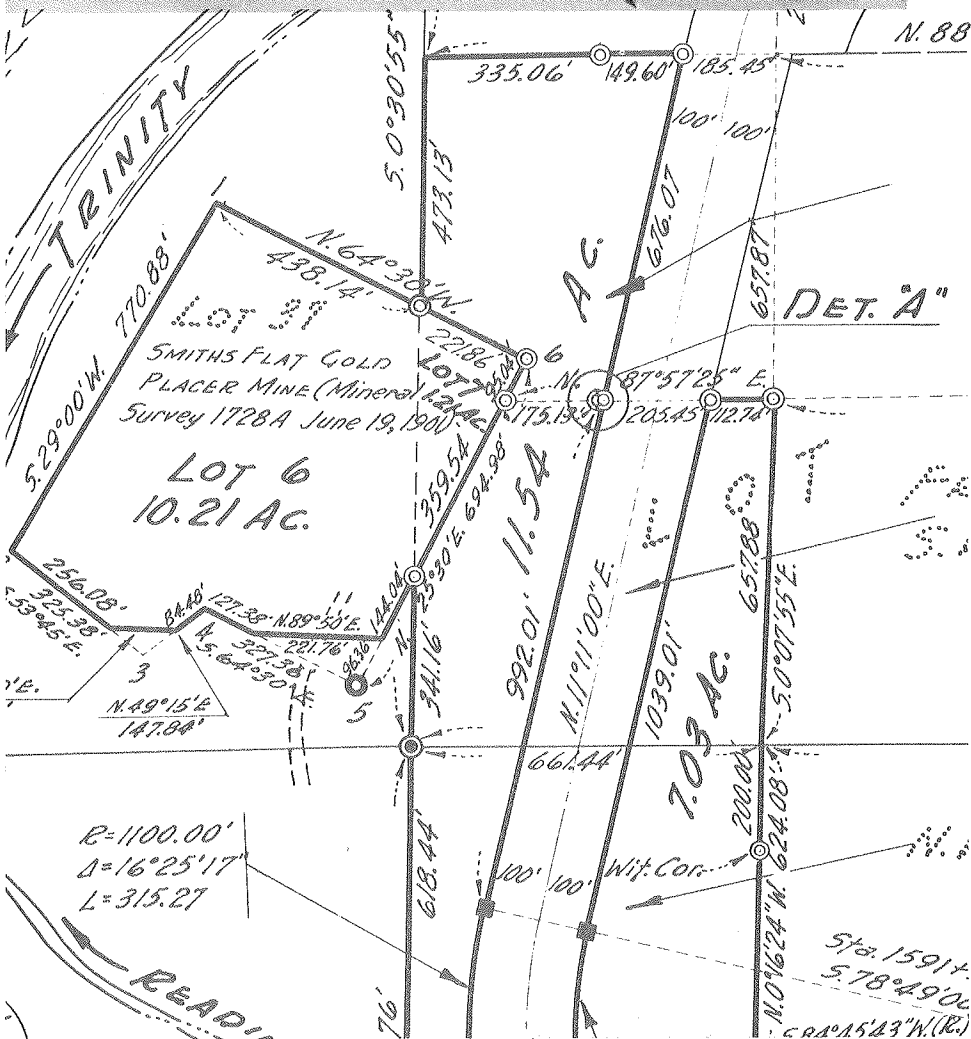
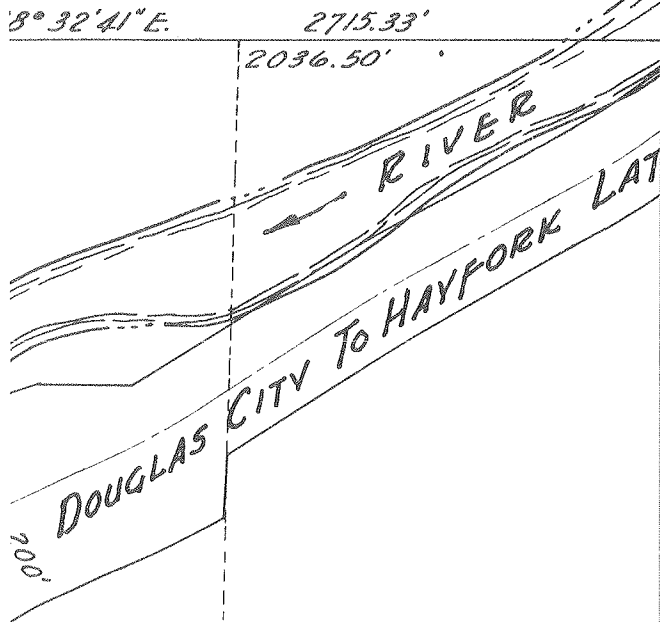
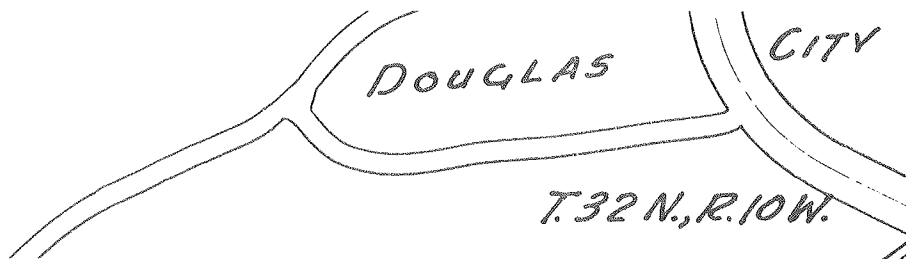
13+00



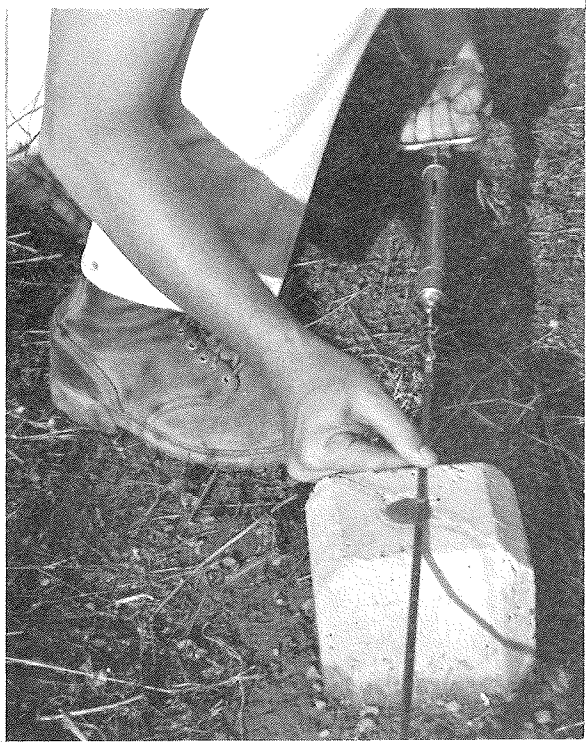
BOUNDARY SURVEYS

B.T. - Bears $5.70^{\circ}E$, 48'
 & $5.25\frac{1}{2}^{\circ}N$, 47.2'

E. 5.438 19'



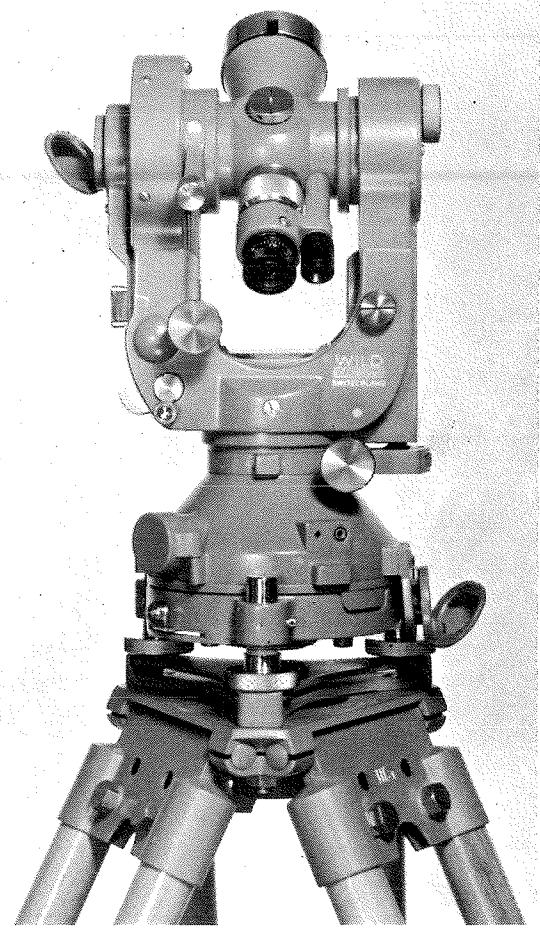
FUNCTIONAL
 NW 1/4 SW 1/4 NE 1/4



SOME OF OUR SURVEYING EQUIPMENT



G.	HDR DIST.	SLOP DIST
	52.53	300.6
	11-10	
	10-30 LT.	

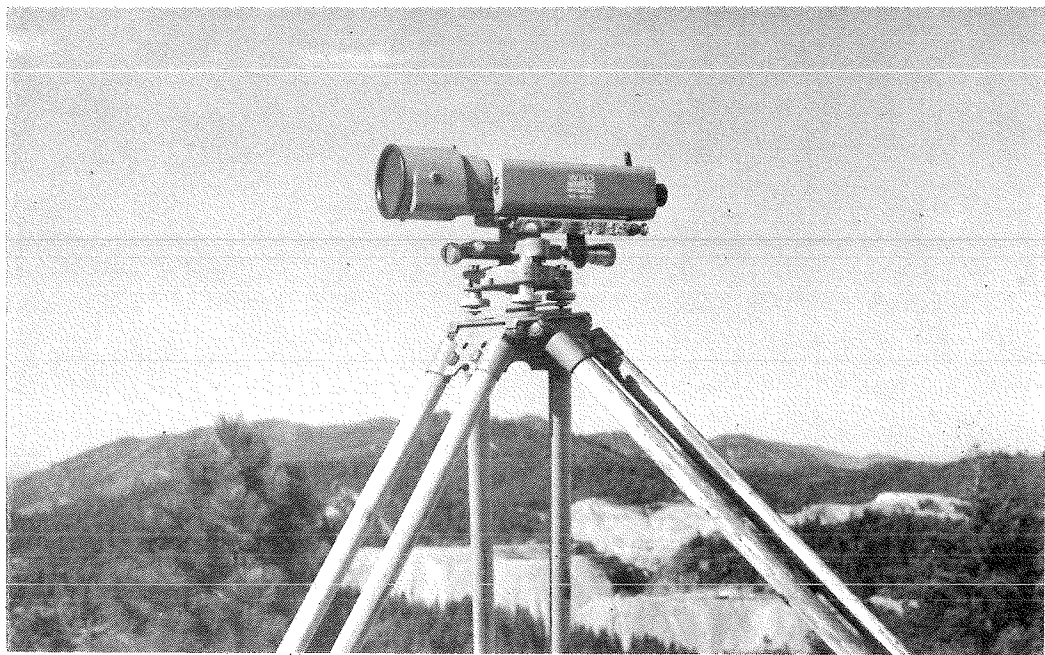


Tellurometer

199' - 4"	2-10-20	197.
2-10-20		
HT. 5 ^B		
S-1° W		

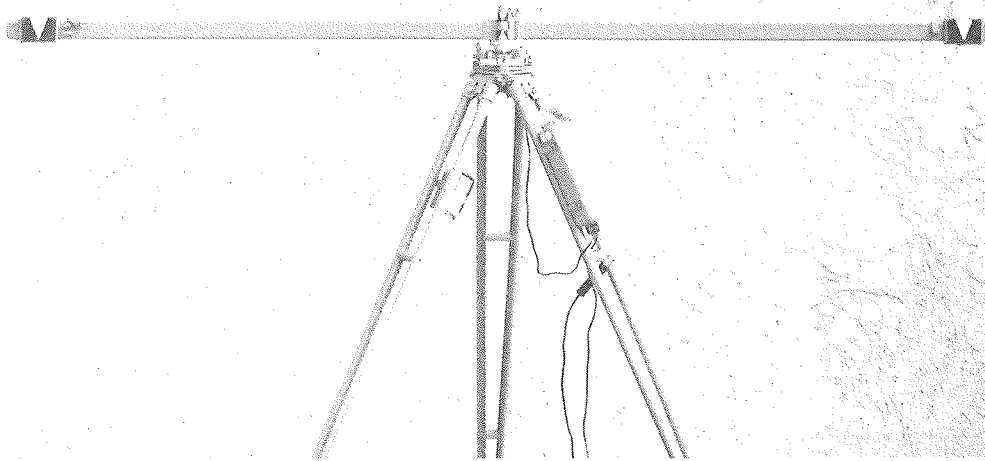
Wild T-2 Theodolite

Wild N-III Precision Level



-3 1/2
-3° 20' J-

JOB
 BY
 SET



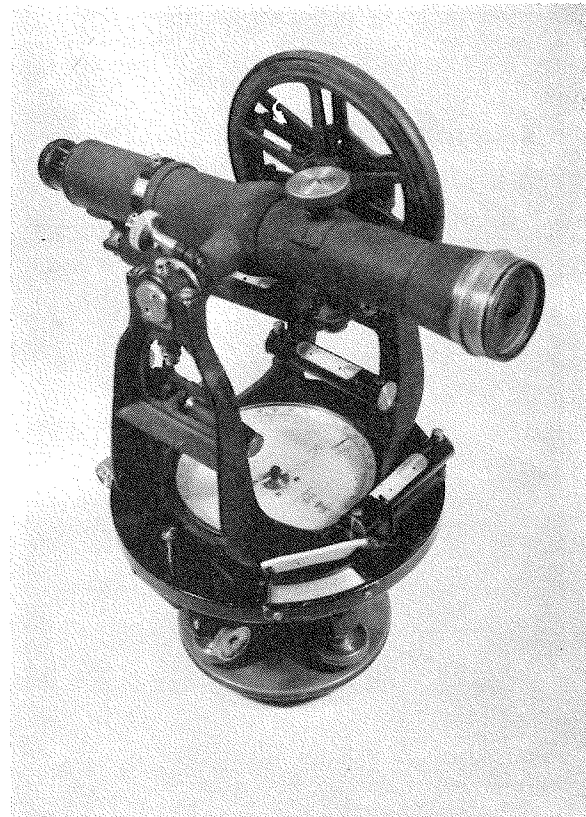
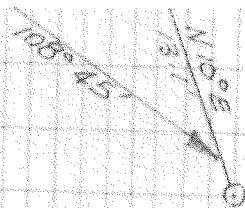
Wild Invar Subtence Bar

SET 2x2 HUB



Zeiss Ni 2 Self-leveling Level

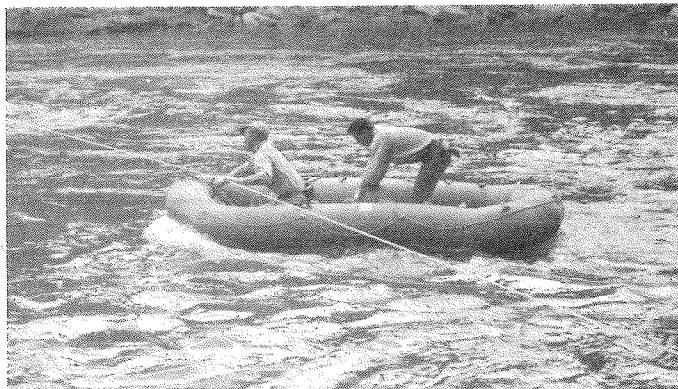
FND. 2x2 HUB



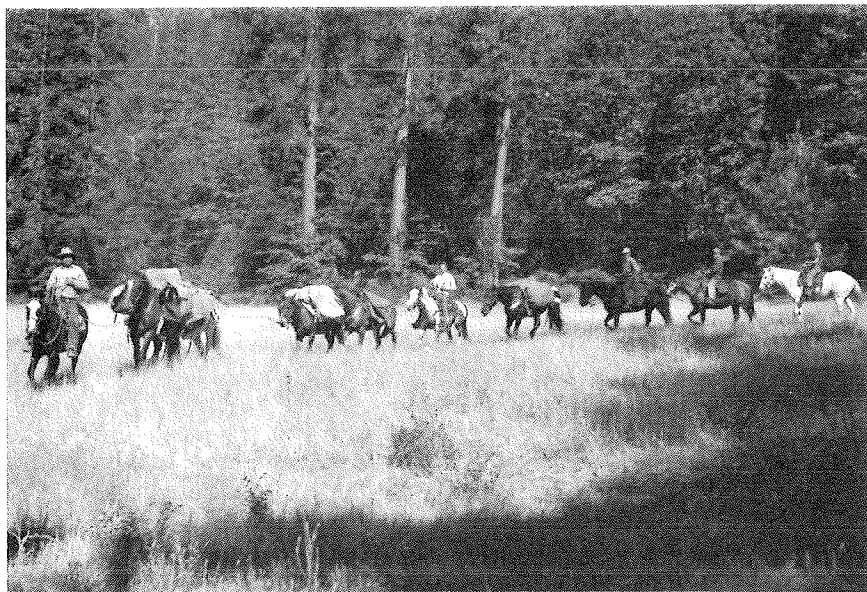
K & E Transit

24 SET 70s
 228 ROCK N.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
SOUTH FORK AMERICAN RIVER PROJECT
Preliminary Control Surveys



PACIFIC GAS & ELECTRIC COMPANY
PIT McCLOUD PROJECT
Preliminary Control Surveys



SACRAMENTO MUNICIPAL UTILITY DISTRICT
AMERICAN RIVER PROJECT — RUBICON DIVERSION
Control Surveys



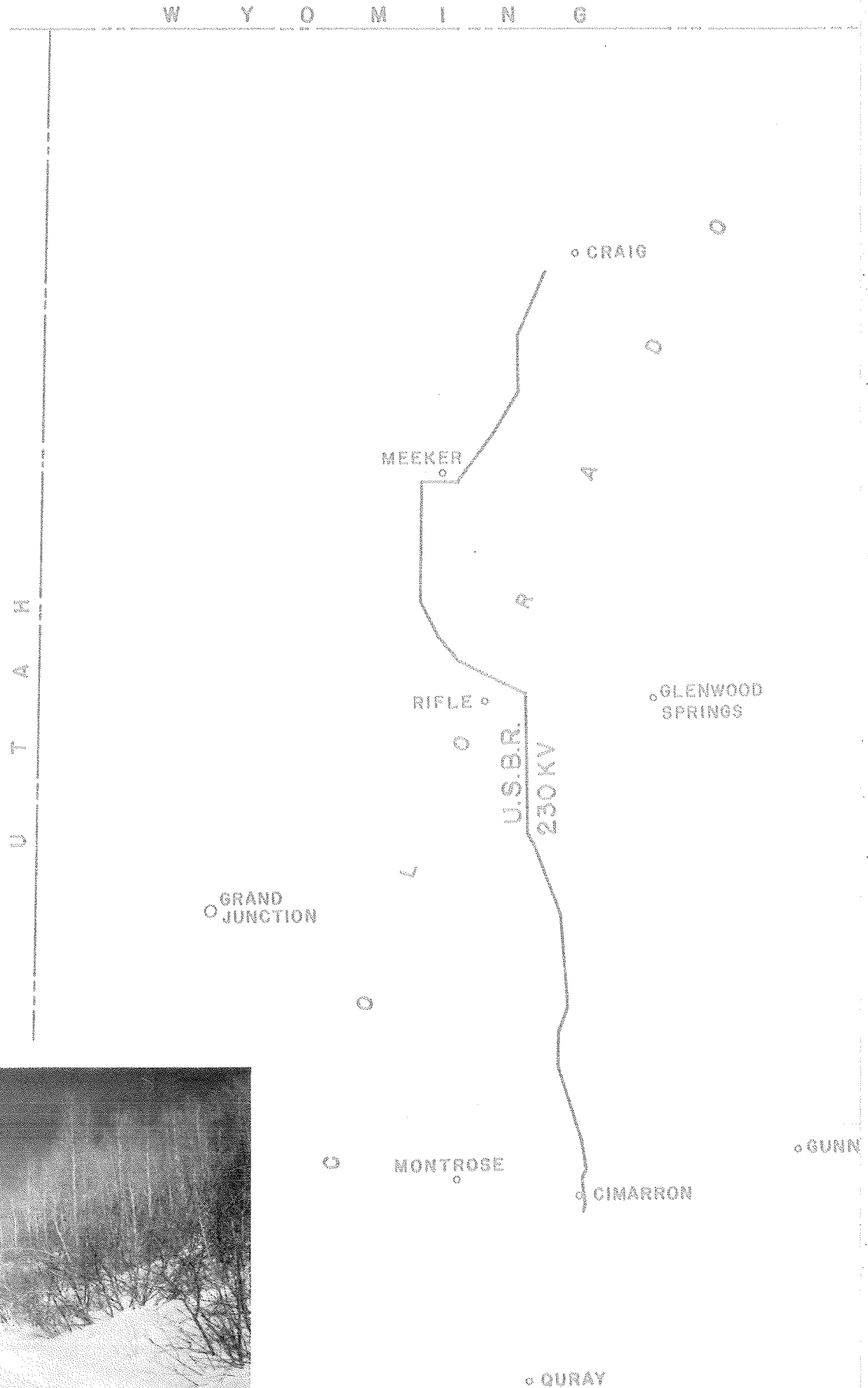
COMPUTING

Clary DE-60 Computer



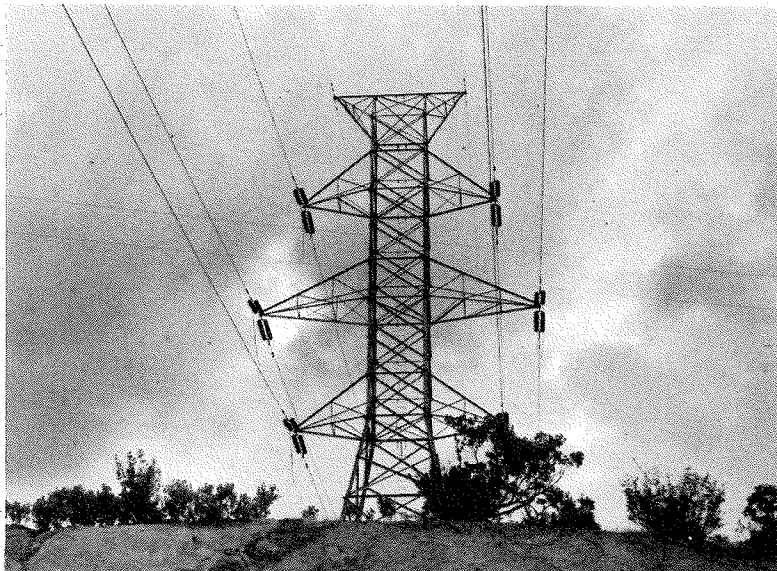
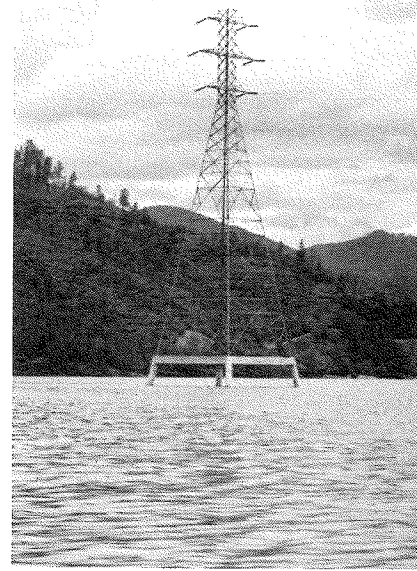
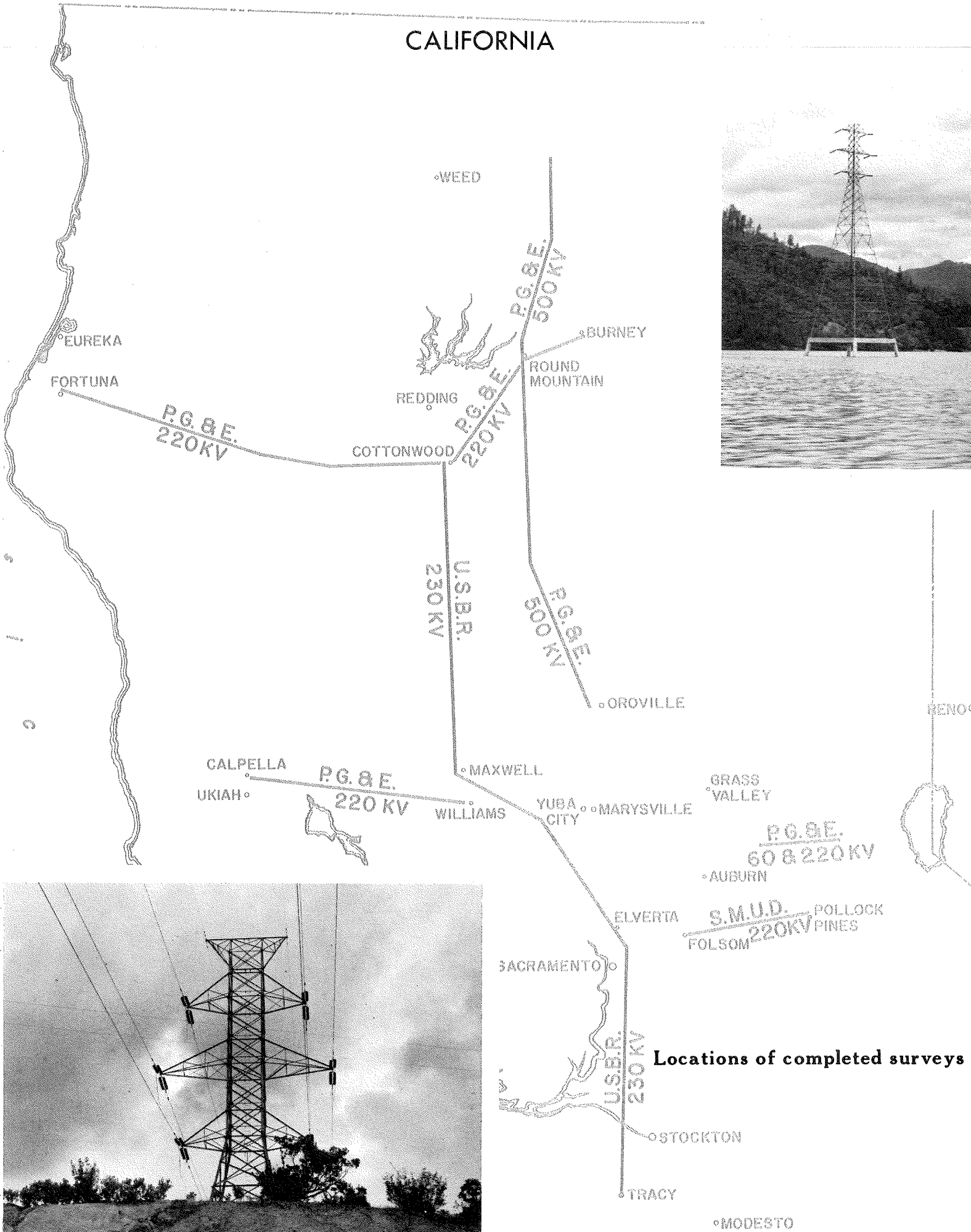
TRANSMISSION LINE SURVEYS

COLORADO



TRANSMISSION LINE SURVEYS

CALIFORNIA



Locations of completed surveys

PARTIAL LIST OF CLIENTS

Aero Service Corporation	Pacific Telephone & Telegraph Company
Associated Oil Company	Richfield Oil Company
Bank of America	Roth Properties
Bechtel Corporation	Scott Lumber Company
Citizens Utilities	Shell Oil Company
Crocker-Citizens National Bank	Signal Oil Company
Diamond National Corporation	Southern Pacific Company
General Petroleum Company	Standard Oil Company
Kimberly-Clark Corporation	Texaco Incorporated
Mountain Copper Company	United California Bank
Pacific Gas & Electric Company	United States Plywood Corporation
Pacific Greyhound	Western Telephone Company
City of Bijou	City of Red Bluff
City of Chico	City of Redding
City of Folsom	City of Santa Cruz
City of Klamath Falls	City of Tulelake
City of Placerville	City of Woodland
Sacramento Municipal Utility District	
Butte County	Shasta County
Del Norte County	Siskiyou County
U. S. Bureau of Indian Affairs	
U. S. Bureau of Public Roads	
U. S. Bureau of Reclamation	
U. S. Corps of Engineers	
U. S. Forest Service	
U. S. National Parks Service	

DATA PROCESSING

12/28	F1221.01	9	1.55
12/28	F1221.01	210 04	
12/28	F1221.01	210 78	
12/28	F1221.01	210 87	
12/28	F1221.01	212 08	
12/28	F1221.01	212 20	1
12/28	F1221.01	212 22	1
12/28	F1221.01	212 23	
12/28	F1221.01	212 48	
12/28	F1221.01	212 78	
12/28	F1221.01	214 13	16
12/28	F1221.01	214 14	2
12/28	F1221.01	214 19	
12/28	F1221.01	214 20	1.0
12/28	F1221.01	214 22	14.0
12/28	F1221.01	214 27	2.0
12/28	F1221.01	214 48	47.0
12/28	F1221.01	214 62	5.0
12/28	F1221.01	214 64	850.0



407 Accounting Machine

	4.52
	168.37
	17.89
	7.05
	7.00
	59.50
	38.25
	16.40
	5.48
	27.30
	10.46
	490.10
	8.32
	90.93
	37.84
	87.30
	5.40
	19.67
	3.30
	2.87
	36.74
	29.89
	162.12
	734.49
	29.59
	71.88
	118.04
	238.52
	159.55
	20.29
	58.22
	6.17
	78.99
	64.26
	348.56
	1,579.15
	63.62
	154.54
	253.79
	512.83
	343.03
	43.62
	125.17



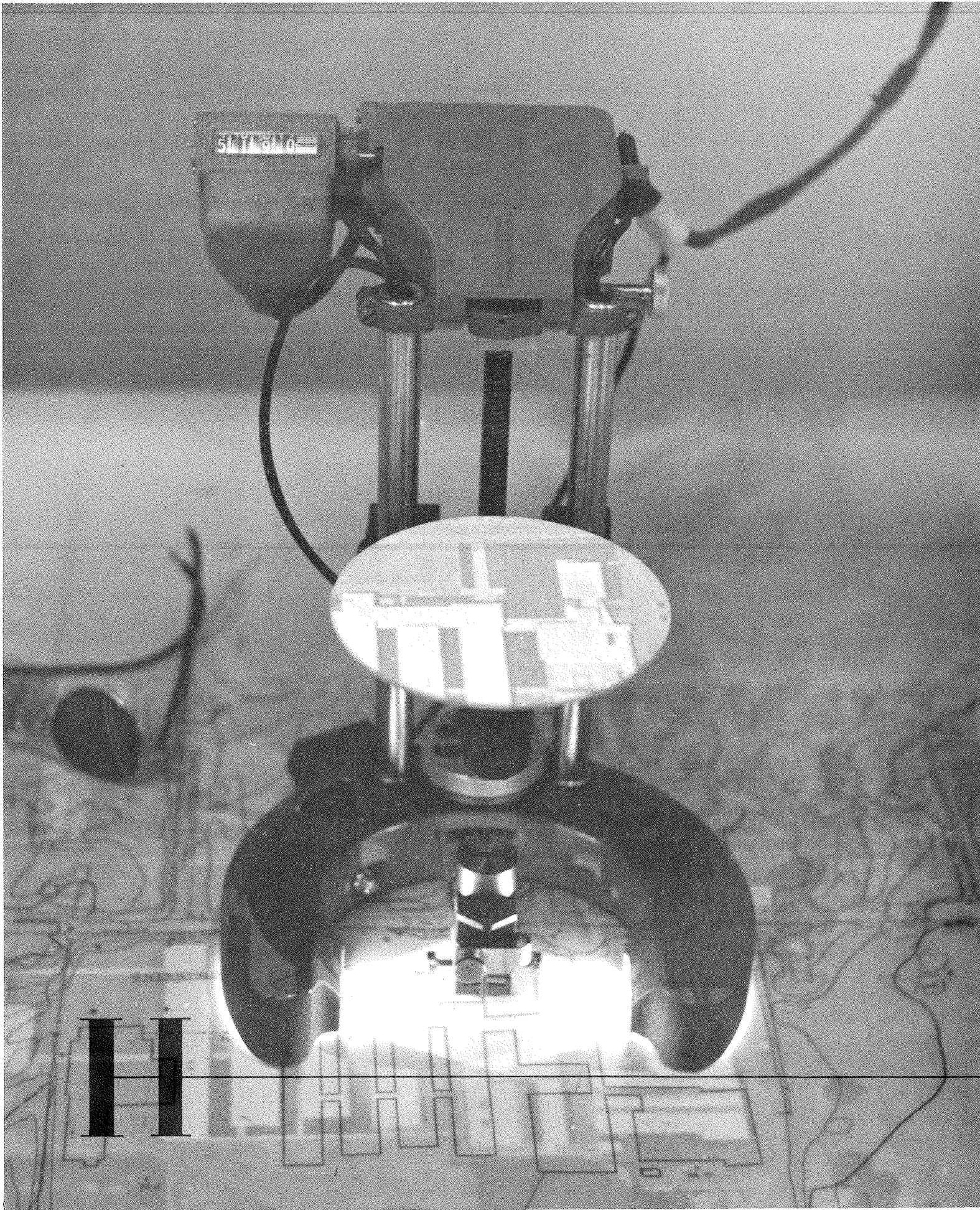
083 Sorter

12/28	F1221.01	216 22	20.0
12/28	F1221.01	216 23	34.0
12/28	F1221.01	216 24	45.0
12/28	F1221.01	216 25	36.0
12/28	F1221.01	216 25	5.0
12/28	F1221.01	216 25	12.0
12/28	F1221.01	216 48	78.0
12/28	F1221.01	216 64	330.0
12/28	F1221.01	216 78	
12/28	F1221.01	217 08	4.0
12/28	F1221.01	217 19	1.0
12/28	F1221.01	217 20	3.0
12/28	F1221.01	217 22	2.0
12/28	F1221.01	217 76	
12/28	F1221.01	218 04	15.0
12/28	F1221.01	218 22	8.5
12/28	F1221.01	219 04	17.5
12/28	F1221.01	219 08	18.0
12/28	F1221.01	219 18	10.0
12/28	F1221.01	219 19	13.0
12/28	F1221.01	219 20	5.0
12/28	F1221.01	219 22	37.5

026 Printing Key Punch



PHOTOGRAMMETRY

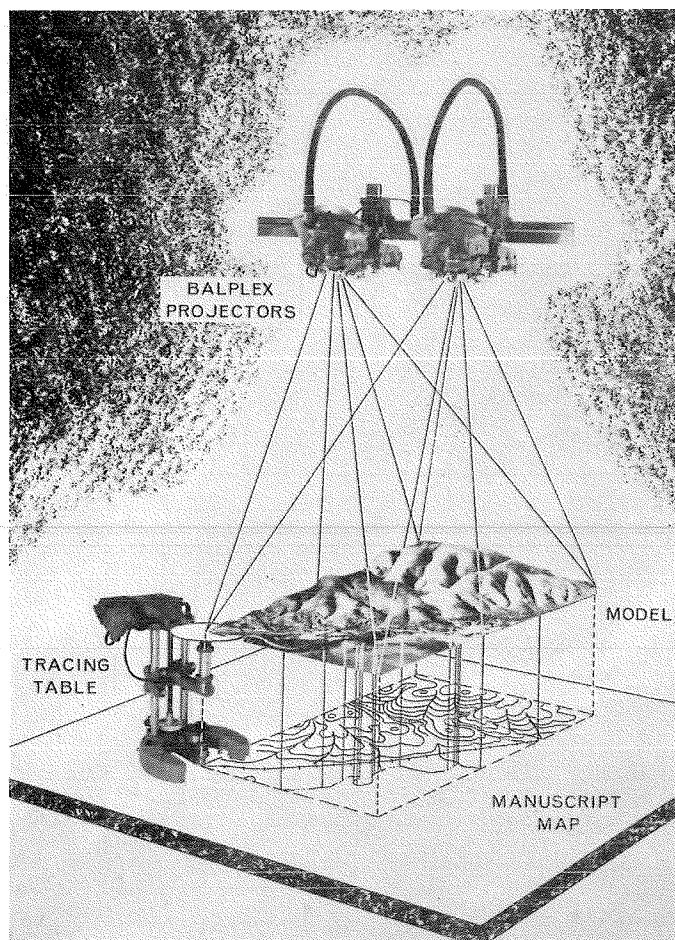


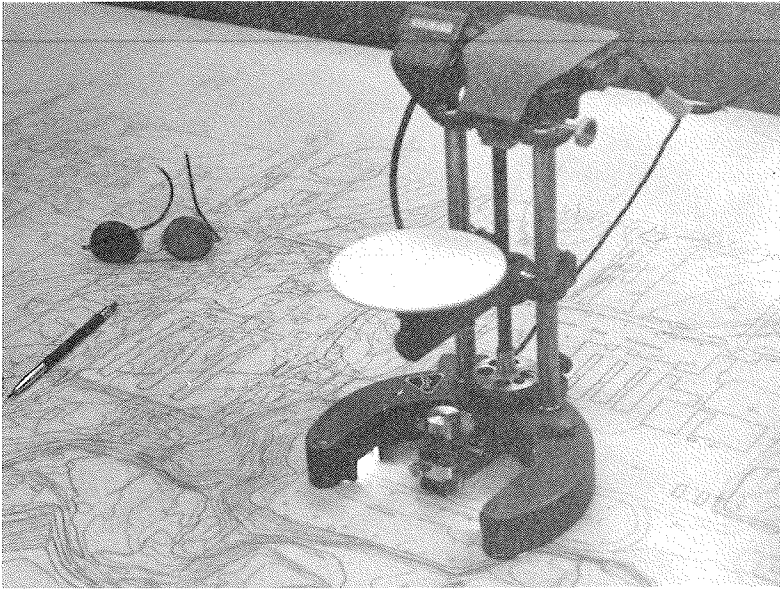
II

PHOTOGRAMMETRY

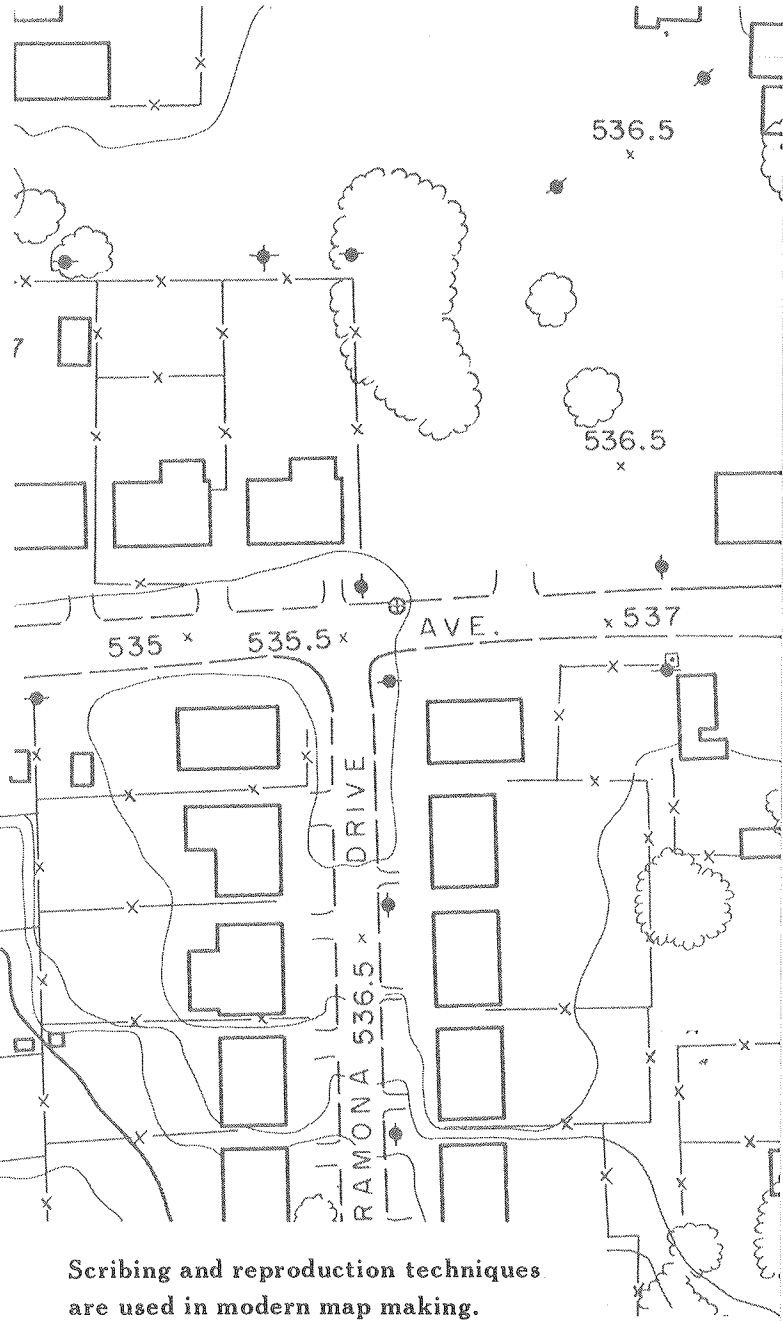
Photogrammetry is the science or art of obtaining reliable measurements by means of photography. The most common concept of photogrammetry is the preparation of topographic maps for engineering design, such as master sewer and storm drain plans, subdivision design, transmission line locations, and highway location and design. We have completed more than 50,000 acres of topographic maps for general engineering at 1" = 100' with 2, 4, and 5-foot contours, have mapped over 250 miles for highway design at 1" = 50' with 2-foot contours for various counties and the California Division of Highways. Other mapping varies from photogrammetric cross-sections with elevations accurate to 0.20 feet to reconnaissance maps with 40-foot contours.

Our research is continuously expanding the field of photogrammetry and photo interpretation into areas such as agricultural mapping, crop interpretation, and cadastral surveys.

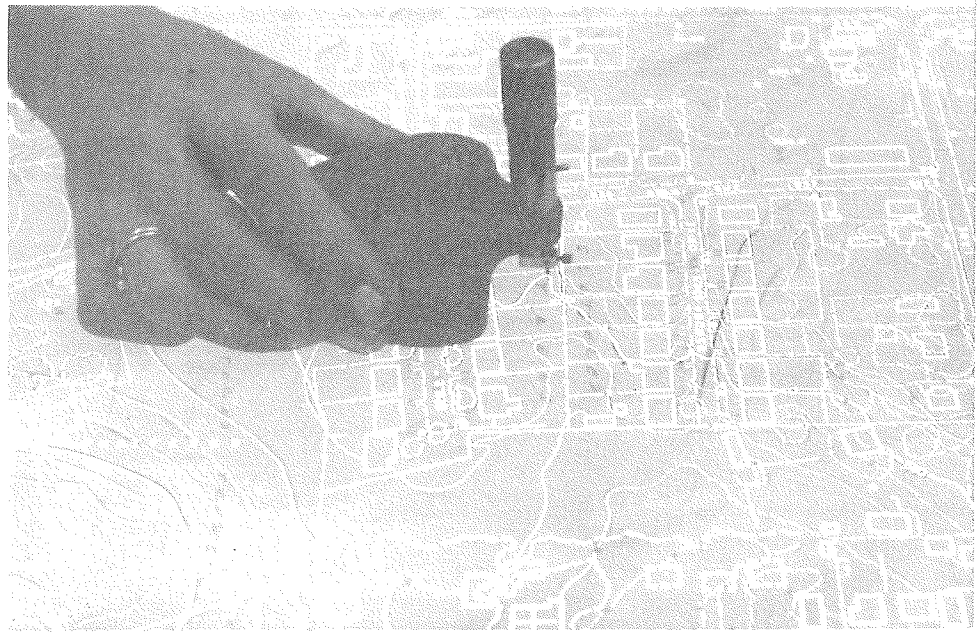




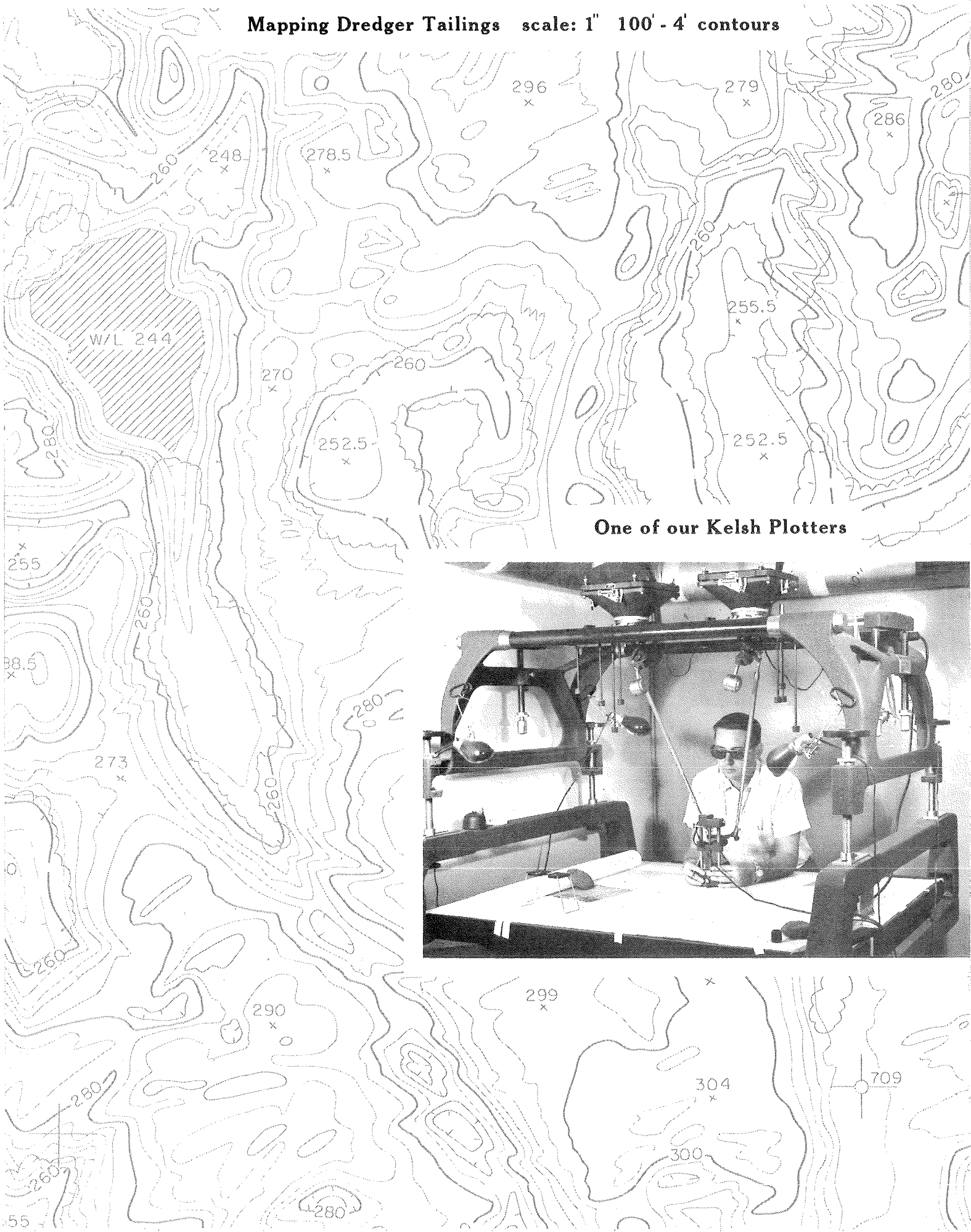
The map manuscripts, on cronomex film, make good reproductions when drafted or scribed sheets are not required.



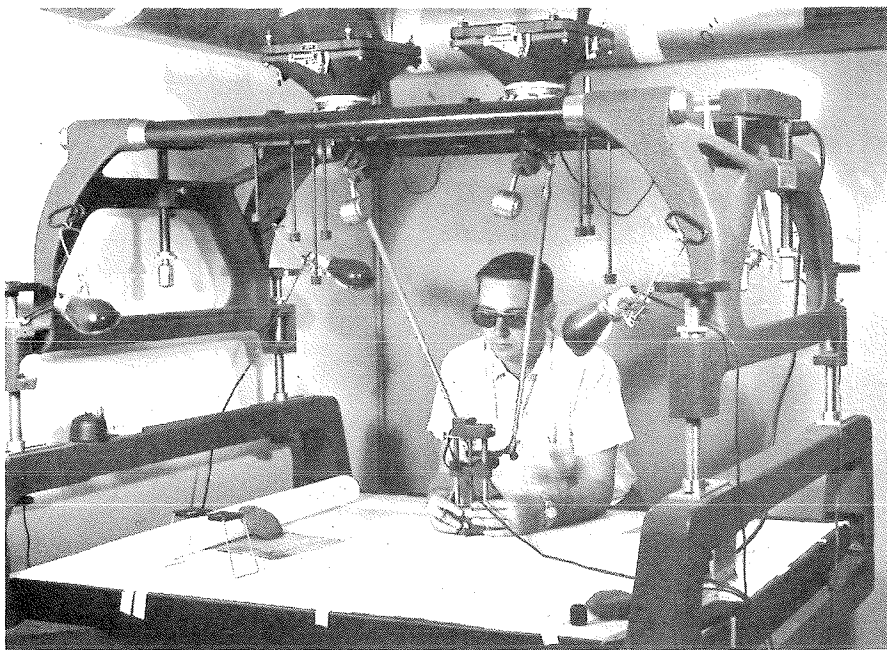
Scribing and reproduction techniques are used in modern map making.



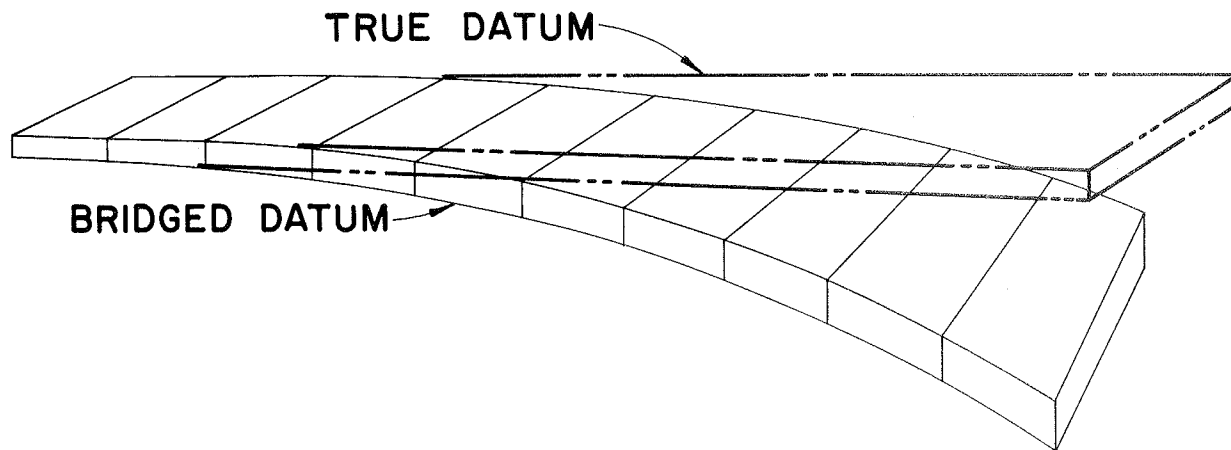
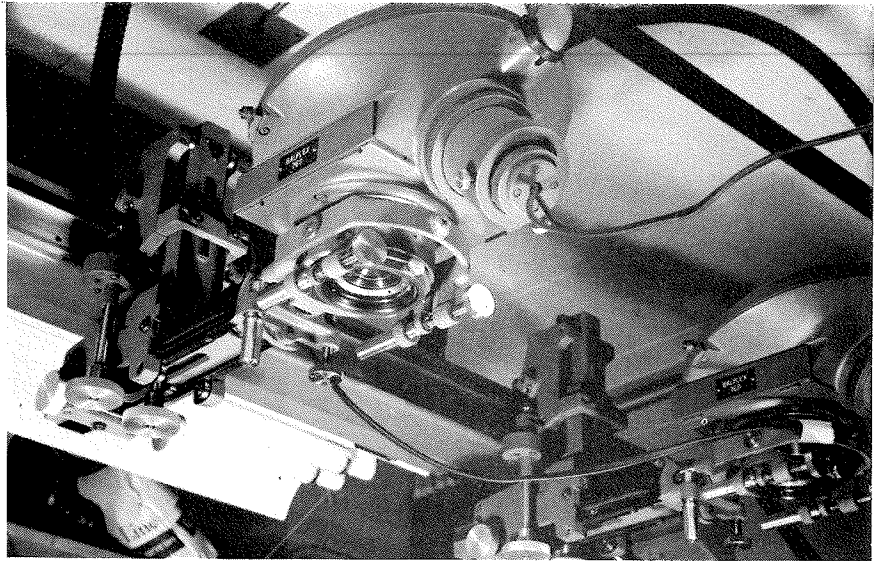
Mapping Dredger Tailings scale: 1" 100' - 4' contours



One of our Kelsh Plotters

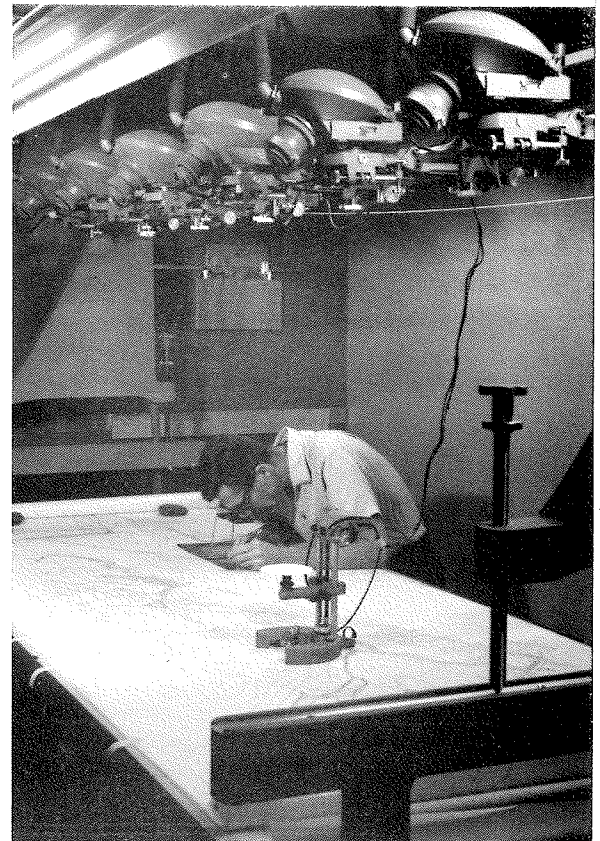


BALPLEX 760 TRIANGULATOR



The Balplex Triangulator is used to bridge between horizontal and vertical control points. Particularly useful in rough terrain and for reconnaissance mapping.

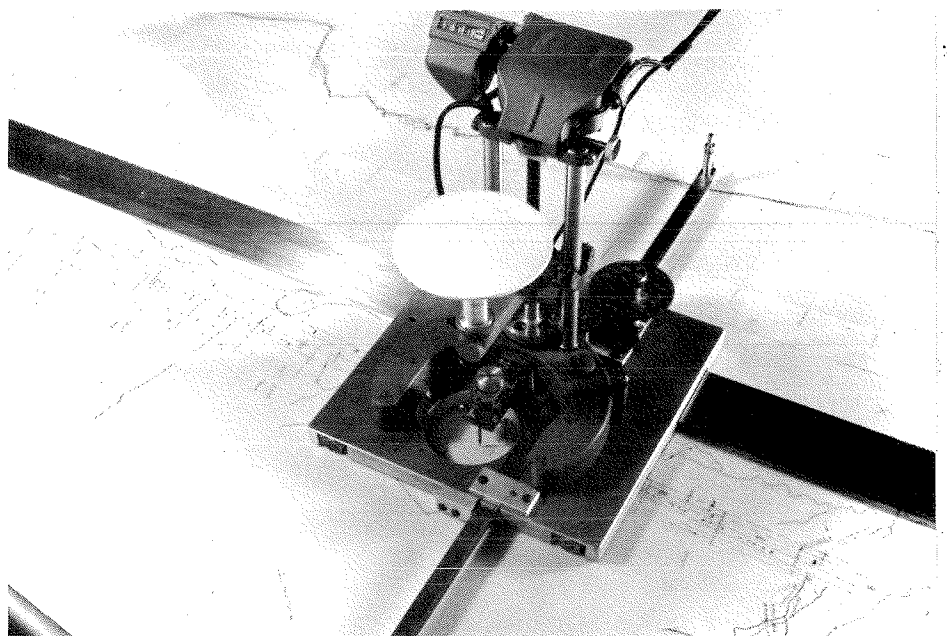
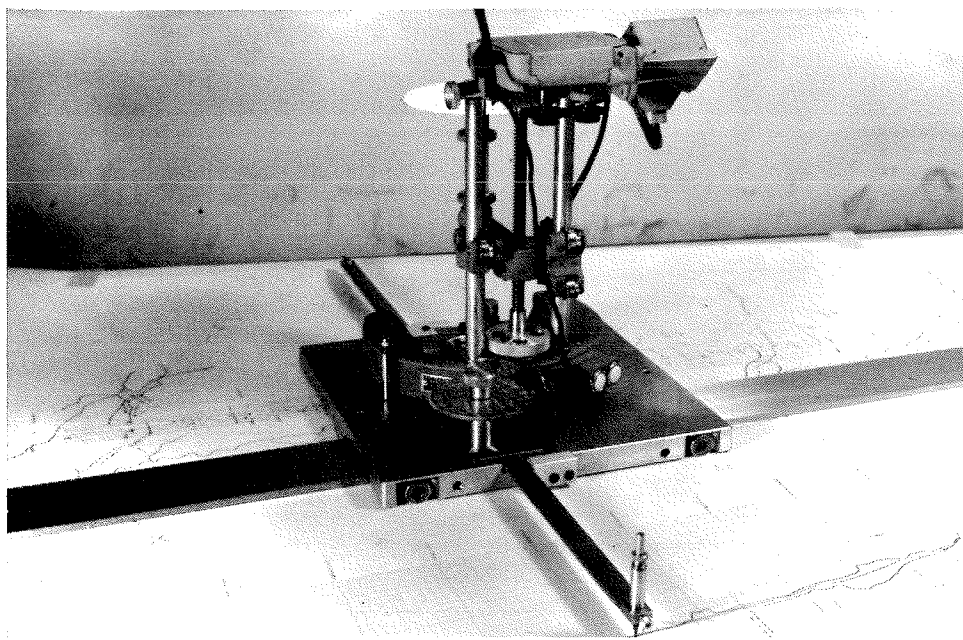
This instrument enlarges the aerial negative 5X. Control can be adjusted graphically and the same manuscript can be used for compilation in our Kelsh Plotters.



EXAGGERATED PROFILE PLOTTER

Developed at Clair A. Hill & Associates by D. R. Mayer
E. B. Word

The purpose of the photogrammetric exaggerated profile plotter is to draw a continuous terrain profile from a projected stereoscopic model. The instrument will accommodate a five-times vertical scale exaggeration. The plotter was designed specifically for engineering route profiles at standard scales such as transmission lines.



PHOTOGRAMMETRIC APPLICATIONS IN AGRICULTURE

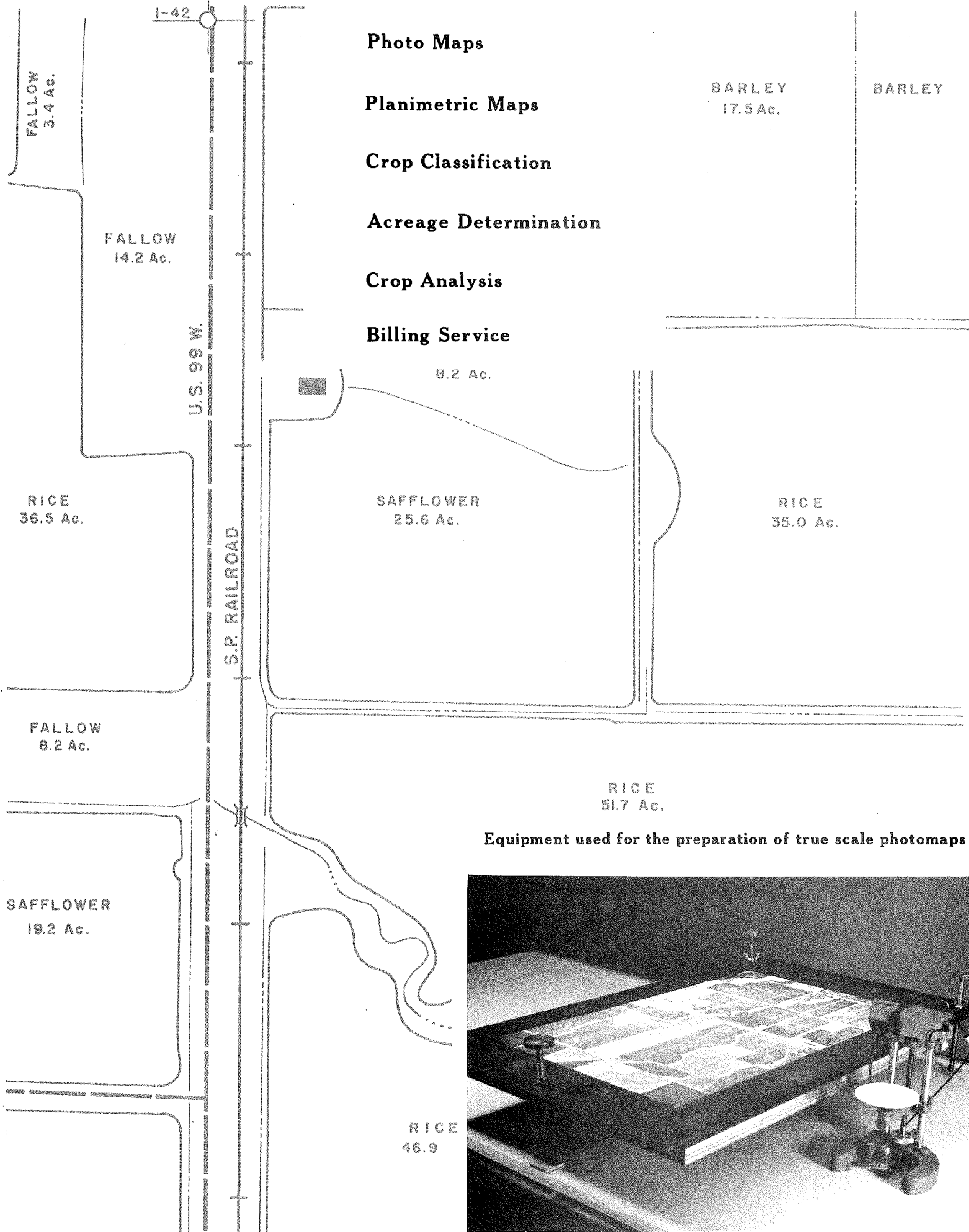


Photo Maps

Planimetric Maps

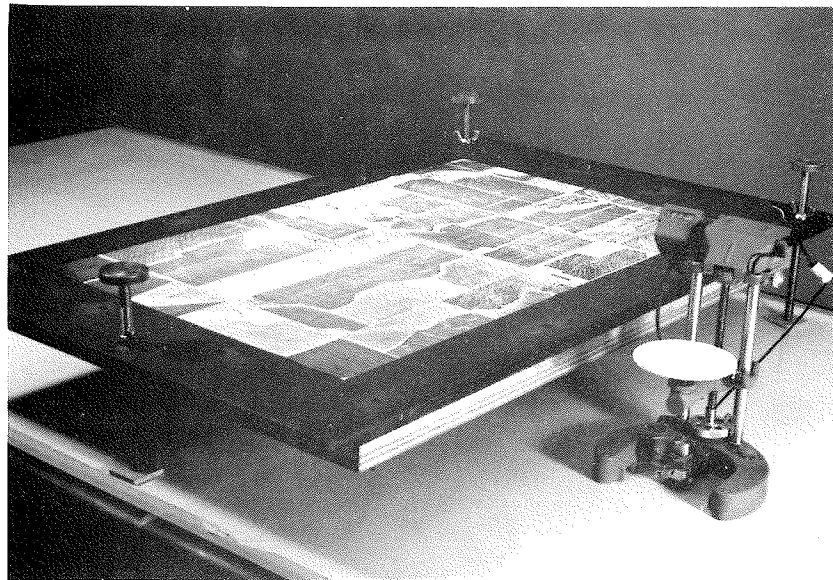
Crop Classification

Acreage Determination

Crop Analysis

Billing Service

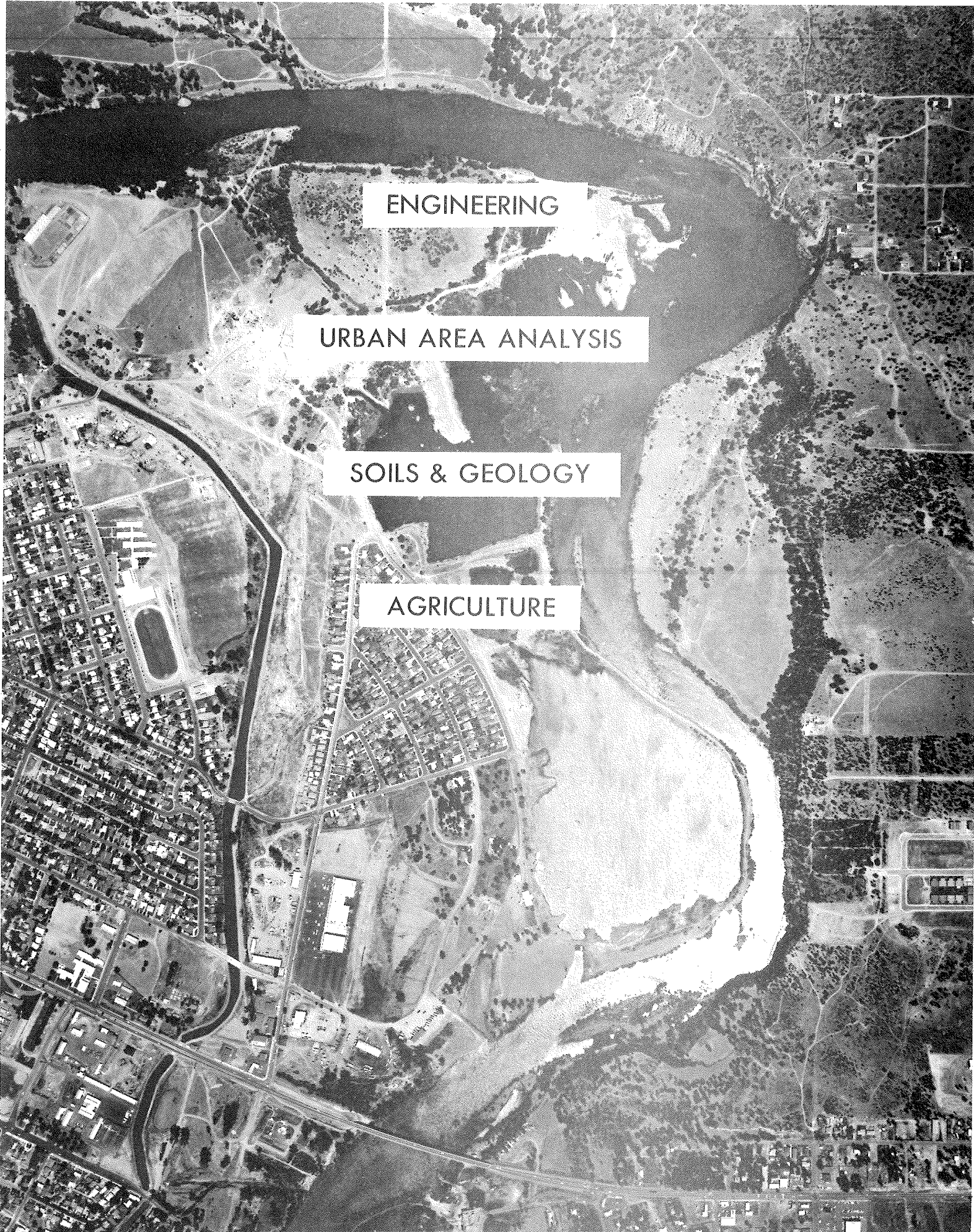
Equipment used for the preparation of true scale photomaps



PARTIAL LIST OF CLIENTS

Biggs Rice Experimental Station	Kimberly-Clark Corporation
Enterprise Public Utility District	Natomas Company
Glenn-Colusa Irrigation District	Pacific Gas & Electric Company
Provident Irrigation District	Standard Oil Company of California
Sacramento Municipal Utility District	Western Geophysical Company of America
South Suburban Sanitary District--Klamath Falls	California Division of Beaches and Parks
South Tahoe Public Utility District	California Division of Highways
City of Folsom	U. S. Air Force
City of Medford	U. S. Bureau of Indian Affairs
City of Placerville	U. S. Bureau of Public Roads
City of Red Bluff	U. S. Bureau of Reclamation
City of Redding	U. S. Corps of Engineers
City of Santa Cruz	U. S. Department of Agriculture
City of Weaverville	U. S. Forest Service
Del Norte County Department of Public Works	
Placer County Water Agency	
Shasta County Department of Public Works	
Siskiyou County Department of Public Works	

PHOTO INTERPRETATION

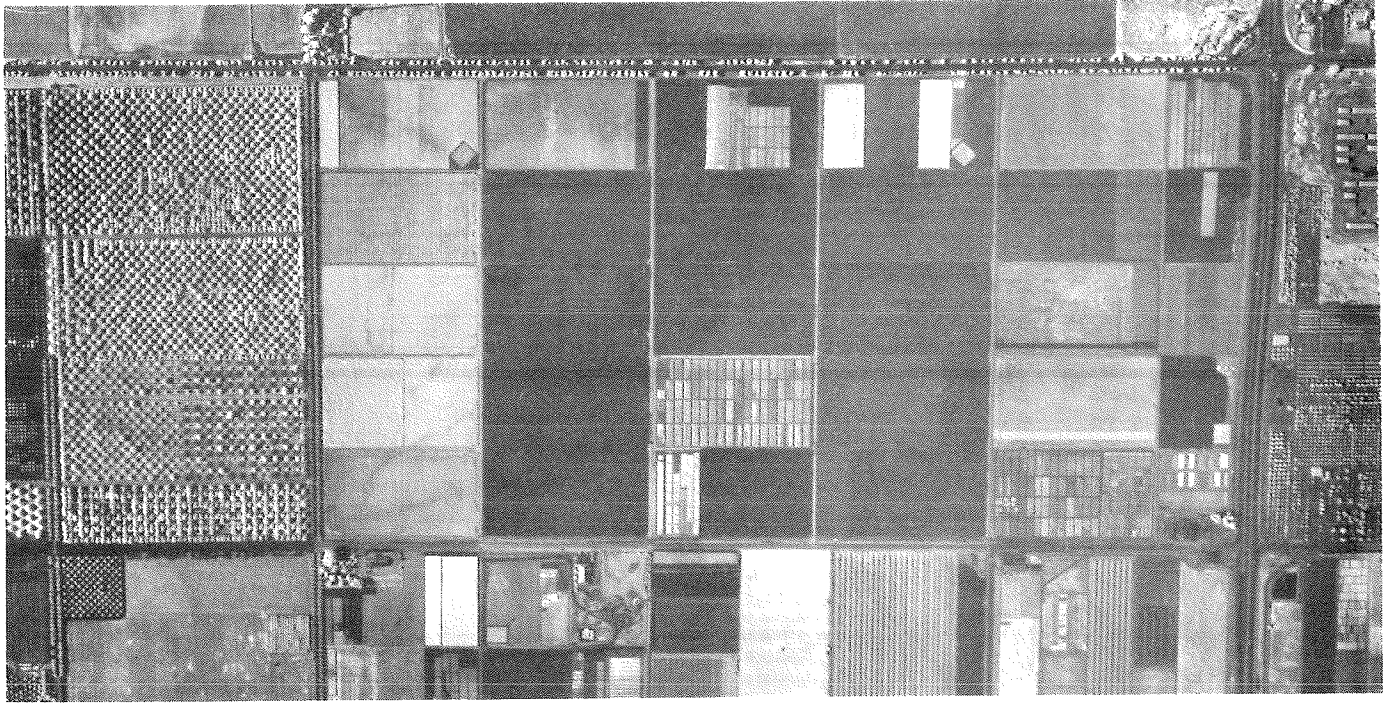


ENGINEERING

URBAN AREA ANALYSIS

SOILS & GEOLOGY

AGRICULTURE



Scale 1: 12,000 INFRARED (25A) MAY 15, 1963

These photos were part of a Photo Interpretation Research Project carried out at the University of California at Davis. The area was photographed with four different films at several different altitudes to determine criteria for crop identification.

Scale 1: 12,000 PANCHROMATIC (12) MAY 16, 1963





Scale 1: 24,000 INFRARED

The infrared photo (above) and the panchromatic photo (below) were flown a few minutes apart on May 21, 1962, from 12,000 feet above ground. The rice fields of part of the 160,000-acre Glenn-Colusa Irrigation District are readily apparent on the infrared photography — since this initial test, we have photographed and mapped nearly 500,000 acres of agricultural land.

Scale 1: 24,000 PANCHROMATIC



