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**EMPLOYMENT AND INCOME
FROM GOLD PLACERING
BY HAND METHODS
1935--37**



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 - * Mechanization and Productivity of Labor in the Cigar Manufacturing Industry
 - † Productivity of Labor in the Cotton-Garment Industry

(List continued on inside back cover)

*Published as Bull. No. 680 of the U. S. Bureau of Labor Statistics.
†Published as Bull. No. 682 of the U. S. Bureau of Labor Statistics.

FEDERAL WORKS AGENCY
WORK PROJECTS ADMINISTRATION

F. C. HARRINGTON
Commissioner

CORRINGTON GILL
Assistant Commissioner

NATIONAL RESEARCH PROJECT

on

Reemployment Opportunities and Recent Changes
in Industrial Techniques

DAVID WEINTRAUB

Director

In cooperation with

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

R. R. Sayers, Director

Mineral Technology and Output Per Man Studies
O. E. Kiessling, Economist in Charge



SMALL-SCALE PLACER MINER PANNING

WOR

EMPLOYMENT AND INCOME FROM GOLD PLACERING
BY HAND METHODS, 1935-37

by

Robinson Newcomb, Charles White Merrill,
and R. L. Kiessling

WORK PROJECTS ADMINISTRATION, NATIONAL RESEARCH PROJECT

In cooperation with

DEPARTMENT OF THE INTERIOR, BUREAU OF MINES

Report No. E-14

Philadelphia, Pennsylvania

June 1940

**THE WPA NATIONAL RESEARCH PROJECT
ON REEMPLOYMENT OPPORTUNITIES AND RECENT CHANGES
IN INDUSTRIAL TECHNIQUES**

Under the authority granted by the President in the Executive Order which created the Works Progress Administration, Administrator *Harry L. Hopkins* authorized the establishment of a research program for the purpose of collecting and analyzing data bearing on problems of employment, unemployment, and relief. Accordingly, the National Research Program was established in October 1935 under the supervision of *Corrington Gill*, Assistant Administrator of the WPA, who appointed the directors of the individual studies or projects.

The Project on Reemployment Opportunities and Recent Changes in Industrial Techniques was organized in December 1935 to inquire, with the cooperation of industry, labor, and governmental and private agencies, into the extent of recent changes in industrial techniques and to evaluate the effects of these changes on the volume of employment and unemployment. *David Weintraub* and *Irving Kaplan*, members of the research staff of the Division of Research, Statistics, and Finance were appointed, respectively, Director and Associate Director of the Project. The task set for them was to assemble and organize the existing data which bear on the problem and to augment these data by field surveys and analyses.

To this end, many governmental agencies which are the collectors and repositories of pertinent information were invited to cooperate. The cooperating agencies of the United States Government include the Department of Agriculture, the Bureau of Mines of the Department of the Interior, the Bureau of Labor Statistics of the Department of Labor, the Railroad Retirement Board, the Social Security Board, the Bureau of Internal Revenue of the Department of the Treasury, the Department of Commerce, the Federal Trade Commission, and the Tariff Commission.

The following private agencies joined with the National Research Project in conducting special studies: the Industrial Research Department of the University of Pennsylvania, the National Bureau of Economic Research, Inc., the Employment Stabilization Research Institute of the University of Minnesota, and the Agricultural Economics Departments in the Agricultural Experiment Stations of California, Illinois, Iowa, and New York.

Since September 1, 1939, the Project has been sponsored by the National Resources Planning Board, Executive Office of the President, Washington, D. C.

F. C. HARRIS
COMMISSIONER OF

Colonel
Commissioner

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FEDERAL WORKS AGENCY
WORK PROJECTS ADMINISTRATION

1734 NEW YORK AVENUE NW.
WASHINGTON, D. C.

F. C. HARRINGTON

COMMISSIONER OF WORK PROJECTS

June 13, 1940

Colonel F. C. Harrington
Commissioner of Work Projects

Sir:

There is transmitted herewith the report entitled *Employment and Income From Gold Placering by Hand Methods, 1935-37.*

This report shows that hand placering for gold is a vanishing frontier enterprise from which it is now next to impossible to extract a living. Soon after the depression set in thousands of unemployed with their families attempted small-scale placer mining as a source of livelihood. During the early years of the rush to the creeks the number of would-be miners failing to find gold was 20 times greater than the number of miners who had been successful in recovering an amount sufficient for even one sale. Disillusionment was rapid, and by 1933, a year in which at least 100,000 men tried their hand at placer mining, departures greatly exceeded arrivals at the diggings. By 1937 the number seeking gold had dropped to approximately 22,000, of whom a fifth recovered no gold at all. Moreover, small-scale placer mining has generally offered employment only for a very short time even to those who had some success. About half of those who found any gold gave up the effort within a month, and three-quarters within 2 months. Because climate and stream conditions frequently limit the work-year, and because seasonal jobs in other industries sometimes are available at higher wages, even the comparatively small number of full-time miners worked only 8 months out of the year.

The average gross earnings for the miners who found gold in California, where most of the hand placering is carried on, were \$6.02 per week for the

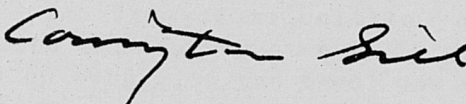
3 years 1935-37, and the weekly income of nearly a third of the placer operators did not exceed \$3.50. These figures represent gross earnings for a full week's work; returns per calendar week are lower because of broken working time; net returns are still smaller because of commissions paid to bullion buyers and necessary expenses incidental to mining.

When the low level of weekly earnings and the short periods of work are known it is not surprising that yearly returns from gold placering by hand methods are found to be pitifully small. Gross average annual earnings per miner for California ranged from \$44 to \$59 in the years 1935-37.

The survey did reveal one small group of miners to whom placering is important. These are the men to whom placering offers an opportunity for work in off seasons and to earn something between jobs. When lumber camps are idle, when no harvests are offering work, when shops are closed for repairs or waiting for orders, placering provides something to do even though the returns are small. In certain limited areas, therefore, placering may yield enough to men with irregular jobs to be of marked aid to them even though it does not yield enough for support in the absence of other sources of income.

If placering is thus looked upon only as a supplemental source of income for residents of the areas with placer deposits, it can be made to fill a definite but very minor place in the economy of the few communities in which gold-bearing gravels are found and to help a few hundred men at most.

Respectfully yours,



Corrington Gill
Assistant Commissioner

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PREFACE

An earlier study of small-scale placer-gold mining presented data on production and employment in the industry and information on the techniques used in the hand mining of gold and on the characteristics of the workers who sought a livelihood in this manner. In addition, tabulations based on a sample of United States Mint purchase records were developed to show yearly earnings from small-scale placer mining and the earnings per day spent on the creeks, both for the casual workers and for those who spent more time in the industry.¹

This report brings the statistical record down through 1937 and adds considerable information, obtained through field trips, on the working methods, the backgrounds, and the living conditions of the small-scale placer miners. Moreover, additional and complete tabulations from Mint records have been analyzed to throw further light on the amount and distribution of incomes received by those who work at placering; the basic tabulations of these data were prepared by the Northern California Work Projects Administration, Official Project Nos. 265-3-7009 and 365-03-3-1.

This report is one of a series of studies conducted by the National Research Project in cooperation with the United States Bureau of Mines under the direction of O. E. Kiessling. All of the field work and preliminary assembly of material was done by Charles White Merrill, Supervising Engineer of the Bureau's San Francisco statistical office, in collaboration with David M. Maynard, Work Projects Administration Regional Research Supervisor at San Francisco. Robinson Newcomb prepared the analysis of the data as presented, wrote the final drafts of chapters III, IV, and VI, collaborated with Mr. Merrill in writing chapter VII, and prepared chapters I, II, and V with R. L. Kiessling. Peter J. Haggerty, Superintendent of the United States Mint at San Francisco, and G. L. Swarva, Assayer-in-Charge of the Seattle Assay Office, made available the records of gold buyers who sold their product to the Bureau of the Mint through those offices. Walter W. Bradley, California State Mineralogist, furnished the record of gold sales for California for the period prior to the Mint record that became available follow-

¹C. W. Merrill, C. W. Henderson, and O. E. Kiessling, *Small-Scale Placer Mines as a Source of Gold, Employment, and Livelihood in 1935* (WPA National Research Project in cooperation with U. S. Department of the Interior, Bureau of Mines, Report No. E-2, May 1937). The report is now out of print; however, many of the basic data are reprinted in the present study.

ing the Gold Reserve Act of 1934, and gave generous aid in other ways. Helpful suggestions and assistance were also given by the following employees of the United States Bureau of Mines: Chas. W. Henderson, C. N. Gerry, J. P. Dunlop, and Helen M. Gaylord. The manuscript was prepared for publication under the direction of Edmund J. Stone.

DAVID WEINTRAUB

PHILADELPHIA

June 11, 1940

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CHAPTER I

INTRODUCTION AND SUMMARY OF FINDINGS

The needs of the unemployed in the early 1930's caused many persons to grasp at any possible source of income, no matter how small or temporary it might be. Moreover, perplexed local relief officials, who were as yet receiving no aid from Federal sources, welcomed any possible source of help for the long lines of unemployed that gathered at their offices.

At that critical time fabulous tales of rich gold strikes came to the unemployed and the relief officials. The reports were listened to eagerly by many, and the farther from the gold streams they spread, the more fantastic they became and the more readily they were believed and acted upon. The greater the distance, the greater was the urge to get to the streams. Many local relief officials even "staked" families to gasoline and food for a one-way trip to the new Eldorados.

ROMANTIC PUBLICITY

Headlines like the following appeared at frequent intervals in papers and magazines throughout the country: "Diggings of '49 Again Alive With Gold Seekers"; "Old Prospectors and Jobless Men in Cities Renew Quest for Gold in Streams"; "Children Strike Gold in Back Yard Mining"; "Grass Valley Miners Find Cavern of Gold"; "\$1400 Gold Nugget Found in Sierra"; "Unemployed Are Panning Georgia Creeks"; "Amateur Prospectors Wrest \$3,000 Gold From Idaho Creek"; "Jackass Hill Yields New Gold Pockets"; and "Two Brothers, Sister Make \$1200 Digging Gold."

The accompanying newspaper accounts were not always so romantic as the headlines, but nevertheless they told many a bizarre tale. For instance, the *San Francisco Chronicle* of July 30, 1932, under a Stockton date line, told how even children were finding gold: "Striking a pocket of gold at an 8-foot level in a shaft they sank in the back yard of their home in Sonora, Alice Roderick, 13, and her brother John, 8, have \$275 in the bank today. The youngsters, accustomed to watching mining operations in the Sonora district, were equipped with an old pick and shovel, a stew pan for a shaft bucket, a windlass made of an automobile crank wired to an old fence pole, and 20 feet of rope." The same paper frequently reported promising finds in other parts of the State. For

Note.- Special acknowledgment is made to Chas. W. Henderson, Supervising Engineer, Field Offices Section, Mineral Production and Economics Division, U. S. Bureau of Mines, under whose supervision the field work was conducted and who gave helpful suggestions and criticism.



FIGURE 1.— WIDELY CIRCULATED ACCOUNTS OF NEW GOLD DISCOVERIES STIMULATED THE DEPRESSION GOLD RUSH

example, on January 13, 1932, it reported that miners in Grass Valley "working a claim 2 miles north of town broke into a 12-foot wide cavern, the walls and floor of which they say are rich in gold, carried in placer formation."

Such stories were widely printed as soon as the depression set in. As early as December 18, 1930, the *San Francisco Examiner*, under a Reno date line, carried the following item: "On a barren hillside in the

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Rabbit Hole mining district a gold rush camp, 1930 style, filled the scene today. In place of the covered wagons of a bygone time and saddle horses and pack burros tethered to stakes driven into the ground, automobiles are parked along the roads that wind into the region. . . . It differs little from the old days, the bar is there, a box, and the bartender. Prospectors still were arriving today. The Scossa's ore assays at \$48,680.07 per ton."

Similar stories were carried by papers and magazines in the East as well as in the West. On December 17, 1932, for example, under a Spokane date line, the *New York Times* reported:

Some of the overnight prospectors who had a few lectures and plunged into mountain fastnesses in search of gold a month or two ago have a smile or so coming. It was "sourdough" veterans of scores of summers of prospecting, who smiled when the thousands of old and young men, women and children borrowed pans, acquired grubstakes and trudged into the mountains last spring. But today Bill Powers, a Spokane youth who dropped his school books early last summer to prospect, waves a check for \$3,000 which he said came out of Central Idaho Creek beds in the form of gold.

The stories quoted here are tame and unimaginative compared with many that were circulated widely. The following tale, taken from the *San Francisco Call-Bulletin* of February 6, 1930, illustrates the type of report that was most effective in drawing unemployed persons to the gold-bearing streams. Under the headings "More Precious Metals Found by Miners"; "High School Teacher Takes Out \$500 Nugget in Rich Pocket"; and "Gold Strike Continues Almost Daily in The Mother Lode," the story was printed that "Frank Moyle, high school teacher who took out two 5-gallon oil cans of wire gold just before Christmas has taken out another prize. This time a nugget worth \$500. . . . John Sullivan is the only man Frank Moyle will trust in his pocket mine which has produced \$15,000 by Moyle's own admission, and \$100,000 according to hill gossip. They dug 50 feet and found the pocket where he got the two 5-gallon cans of pure gold."

The increase in the price of gold from \$20.67 in 1932 to \$25.56 in 1933 and to \$35.00 in 1934 made such stories seem even more plausible and helped further to stimulate the migration of men to the creeks, despite the unfortunate experiences related by most of those drifting back from the gold-bearing areas. Stories of those who succeeded in making a living and of the very few who made strikes continued to be magnified out of all proportion, both in passing from mouth to mouth and in the press, and brought new recruits to the streams as late as 1937.

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It is obvious to those versed in gold mining that the facts are greatly exaggerated in these stories. The last story cited above was not even based on placer mining but on a "strike" made in a lode mine. To the hard-pressed unemployed, however, these accounts sounded like the answer to their need. How could they know that for every one who made a strike in placer mining, tens of thousands would find little or nothing, that not more than a few score at most could possibly expect to develop a profitable lode mine, and that large amounts of capital would be required for most of these mines? The experience of the thousands who are unsuccessful in placering does not make news; the story of the man here and there who is lucky does. Most of the accounts were stories of success, stories which were news but which were misleading to the unemployed.

NUMBER OF MINERS¹

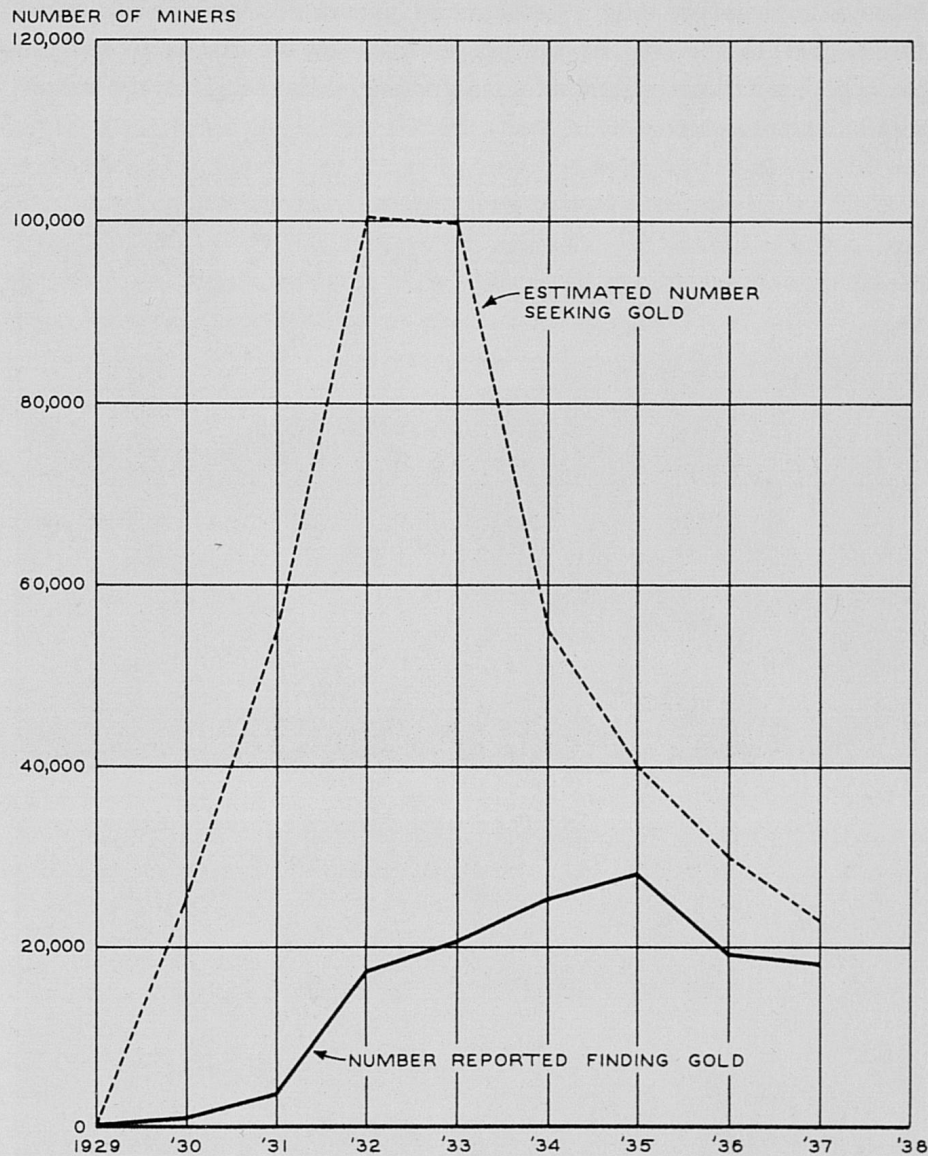
Many thousands of unemployed and their families joined in the gold rush that followed the spread of such success stories. Creeks that later had only 1 or 2 placer miners per mile sometimes harbored 100 men or more per mile searching for precious metal in 1932-33. Of course no count was ever made of those who flocked to the gold-bearing streams, but 100,000 would seem a conservative estimate for 1932 and 1933. The number probably did not drop much until after 1933, for new men kept coming in considerable numbers until 1934. They came from greater and greater distances as the stories spread eastward, and they came rapidly enough to replace the disillusioned families which were leaving. If there was only one turn-over from 1932 through 1933, it would mean that 200,000 men² tried their hand at placering, and that there was 1 would-be miner for every 10 men who were at least 21 years of age in California in 1930.³

¹The terms "miners," "small-scale miners," "small-scale placer miners," and "small-scale placer miners working by hand methods" are used interchangeably in this report. Unless otherwise specified, when any of these terms are used, reference is made to small-scale placer miners using hand methods primarily, supplemented at times by home-made equipment. Almost none of these small-scale operators are miners in the commonly accepted sense of the word. They are not operating with mechanized equipment, and most of them are not operating with even efficient hand equipment. As is more fully described later, many of them are purely casual operators. They try their hand for a few days or weeks and then leave. This study is not concerned with commercial gold mining or with men who are paid to do placer mining but with men who have little or no training, equipment, or capital and who must therefore operate by hand methods. The term "miner" or "small-scale placer miner" is used because it is much shorter than a completely descriptive term which usually would read as follows: An unemployed man who is trying to extract gold from unpatented or unclaimed lean, gold-bearing bars by crude hand methods because he has at least temporarily given up hope of getting a job at fair wages.

²Streams which had been crowded with men in 1932-33 were nearly empty by 1935; yet 28,000 small-scale miners were reported to the U. S. Mint as having recovered and sold gold from small-scale placer mines that year. It would therefore seem highly conservative to say that if 28,000 found gold in 1935, more than 100,000 sought for gold in 1932-33; as the turn-over was high, the estimate of 200,000 seems quite low. See appendix D.

³The U. S. Bureau of the Census reported the number of males 21 years of age or over in California as 2,025,774 in 1930.

Figure 2.- NUMBER OF SMALL-SCALE PLACER MINERS SEEKING AND FINDING GOLD, 1929-37*



*BASED ON TABLES B-1, B-2, AND B-7. FOR DESCRIPTION OF METHOD USED IN PREPARING DATA SEE APPENDIX D.

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Although the vast majority recovered little or no gold, a few miners here and there found gold in modest quantities. Now and then one would make a "strike." In 1935, the year in which the most gold was recovered, the total output was only 2 million dollars for the 28,000 men

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who found gold (and for the estimated 40,000 who tried to find gold), or \$72 per successful miner; the median recovery was but little over \$20. It usually required only a few days of unrewarded work on the auriferous gravels for most of the men who came to the creeks to realize how hopeless the prospects were and to take their families and meager possessions elsewhere.

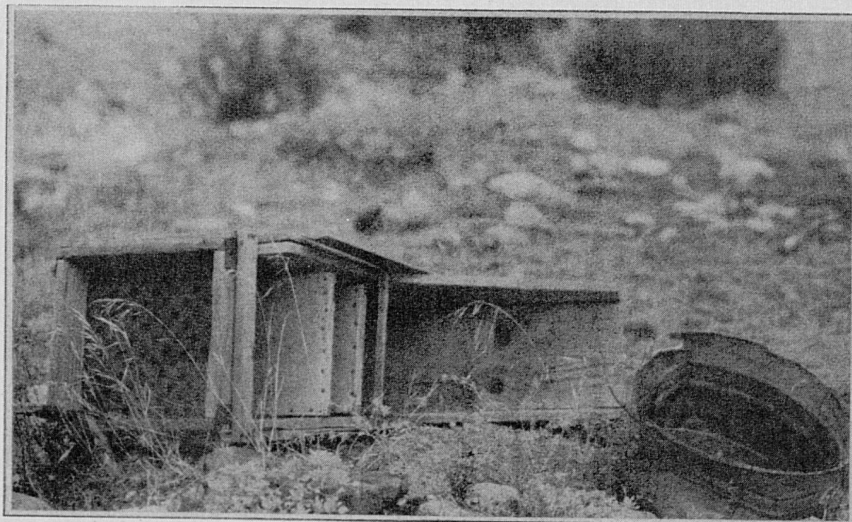
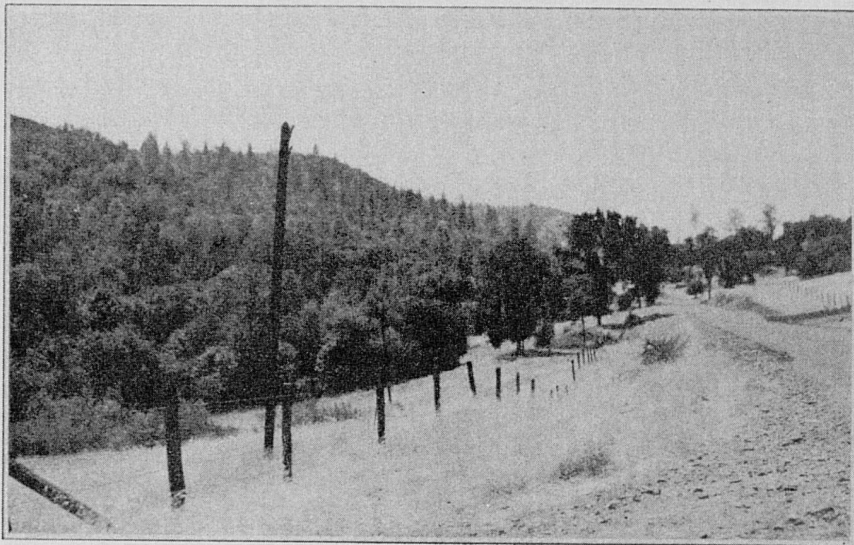


FIGURE 3.— WHERE MINERS CROWDED ONE ANOTHER IN 1932-33.*

In 1932 and 1933 parking space for miners' cars was at a premium on the road shown in the upper view. The nearby creek is now practically deserted, and on its banks are pieces of discarded gold-washing equipment, such as the abandoned rocker shown in the lower view.

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When an opportunity presented itself, the Federal Bureau of Mines made every effort to disseminate reliable information regarding the limitations of small-scale gold mining and to guide misinformed migrants to such localities as held promise. Victor C. Heikes, of the Federal Bureau of Mines, accompanied by Walter W. Bradley and J. F. Bongard, of the California Division of Mines, made an inspection tour of California small-scale placer areas in 1932 and studied the San Francisco Mint receipts in order to procure first-hand data on the subject. They concluded that small-scale placer miners had very small chance of success. Their findings, which were given considerable publicity, helped to strip the romance from the stories being circulated and had some effect in discouraging new migration to the streams.⁴ Some of the State mining bureaus and universities spread information regarding the more promising gold-bearing localities and gave instruction (open to the public) on small-scale placer methods.

As a result of the more widespread dissemination of information on the limited possibilities of placer mining and the discouraging reports of those who drifted back from gold-bearing streams, the number of miners dropped sharply after 1933. There were probably about 40,000 persons working the auriferous beds in 1935, or 60 percent less than in 1932-33. The number in 1937 was probably another 30 percent below the 1935 figure and not much over one-fourth of the 1932-33 peak (see figure 2). Gold production did not drop from 1932 to 1935 with the sharp decline in the number of men at the creeks, for the least efficient miners tended to leave and those who stayed had less crowded bars to work. But after 1935 production dropped more sharply than did the number of miners, for the creeks were becoming exhausted and many of the better men were going back into industry. The 12,422 small-scale miners recorded by the United States Mint as selling gold in California in 1937 sold metal valued at only \$542,186, compared with gold worth \$1,033,093 sold by 19,463 miners in 1935 (see tables B-1 and B-2). It might be pointed out also that the greatest productivity was not reached until 1936, after the crowds had left and when those who knew the business were able to work unhindered by scores of would-be placer miners.

THIS STUDY IN RELATION TO EARLIER REPORT

An earlier report on small-scale placer mining by hand methods, covering the year 1935, was published in 1937.⁵ Since the completion of that

⁴Cf. Victor C. Heikes, *Gold Production of Small Mines in California, 1932* (U. S. Dept. Int., Bur. Mines, Mineral Market Report, M. S. No. 199, May 17, 1933).

⁵C. W. Merrill, C. W. Henderson, and O. E. Kiessling, *Small-Scale Placer Mines as a Source of Gold, Employment, and Livelihood in 1935* (WPA National Research Project in cooperation with U. S. Department of the Interior, Bureau of Mines, Report No. E-2, May 1937).

study, data have been procured that carry the story through 1937, much new statistical material has become available, and the social aspects of the small-scale miner's life have become better known. This report makes use of the additional material and carries the record through 1937.

The principal finding of the first study was the fact that the average gross value of the gold output per small-scale placer miner who found gold in 1935 was only \$72.⁶ In California and Oregon, where 81 percent of the miners who recovered gold worked, the average output was only \$52 and the median recovery was less than half of that figure. But the data obtained did not permit an analysis of earnings in relation to working time, and therefore little was found concerning the week-by-week income of the workers.

The present report takes advantage of the additional data on income and time spent on the creeks and analyzes the figures in some detail by type of miners for the period 1935-37. It also presents a considerable amount of new material on the living conditions of the miners and discusses such factors as their health, provisions for their medical needs, education of their children, their family and social life, and the support given by the miners to the community through taxes or other means. It thus makes possible a consideration of the standard of living maintained on the creeks.

SOURCES

Three major sources of information were used to supply the primary data for this report: Reports filed with the United States Mint by the gold buyers of the country since 1935, reports filed with the State Mineralogist of California by gold buyers of that State, and data obtained in field investigations in areas where small-scale placer miners were most numerous.⁷ In addition to general observations made during

⁶The average output per miner of all who tried placering, irrespective of whether or not they recovered gold, was estimated as only \$50.

⁷In accordance with the requirements of the Gold Reserve Act of 1934, all gold (with minor exceptions which do not affect these reports) must be sold to the U. S. Treasury, and all who buy new gold to sell to the Treasury must be licensed. With each offering of gold to the Treasury, licensees must report, among other things, the name of each miner who supplied gold included in the offering, the amount procured by each miner, the location from which it was taken, and the approximate time spent in taking it. This information must be supplied on Treasury Form TG-21. A reproduction of this form is presented in appendix C.

The California Ore Buyers License Act, commonly referred to as "The High Grade Bill," ch. 70, Statutes 1925; amended 1927; amended 1929 (ch. 183), requires that all bullion buyers in the State be licensed and that they fill out questionnaires (Form No. 505-A) similar to that described above as required by the U. S. Mint, except that no data on working time are required. (This absence of data on working time makes it impossible to use these questionnaires except as a source of information on the total number of miners, total number of sales, and total recovery. U. S. Mint questionnaires available since 1935 are the only source of data for working time and for earnings on a time basis.) Copies of Form No. 505-A must be forwarded to the State Mineralogist each time gold is sold to the U. S. Treasury. A reproduction of this form is presented in appendix C.

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the field investigations, information was obtained in the course of interviews with over 200 of the miners.⁸

Location of Small-Scale Placer Miners

A study of all questionnaires from the 48 States for 1935 revealed that nearly 82 percent of the small-scale placer miners who sold gold in 1935 had found it on the West Coast. Almost 70 percent had mined the gold in California (principally in the northern part), and about 12 percent in Oregon (see figure 4).⁹ Only one other State, Idaho, had as many as 5 percent of the total. Since California so dominated the field, it appeared that the limited funds available could be used most profitably by confining the statistical analysis of the questionnaires to those from California and by limiting the field trips to that State. A few studies were made of operations in Oregon to see if the results in this State confirmed the findings in California. Most of the data on small-scale placer miners, procured both from questionnaires and field trips, therefore refer to California.¹⁰ The statistical analysis is based primarily on data for the years 1935-37.

Reliability of Questionnaire Data

As was previously noted, Federal law requires that data be given the Treasury concerning each sale, each miner selling gold, and the period in which the gold being sold was recovered. For all practical purposes the records cover all gold mined and sold. Some stolen gold may be included in the reports used but not in sufficient quantities to affect the results in any appreciable fashion.

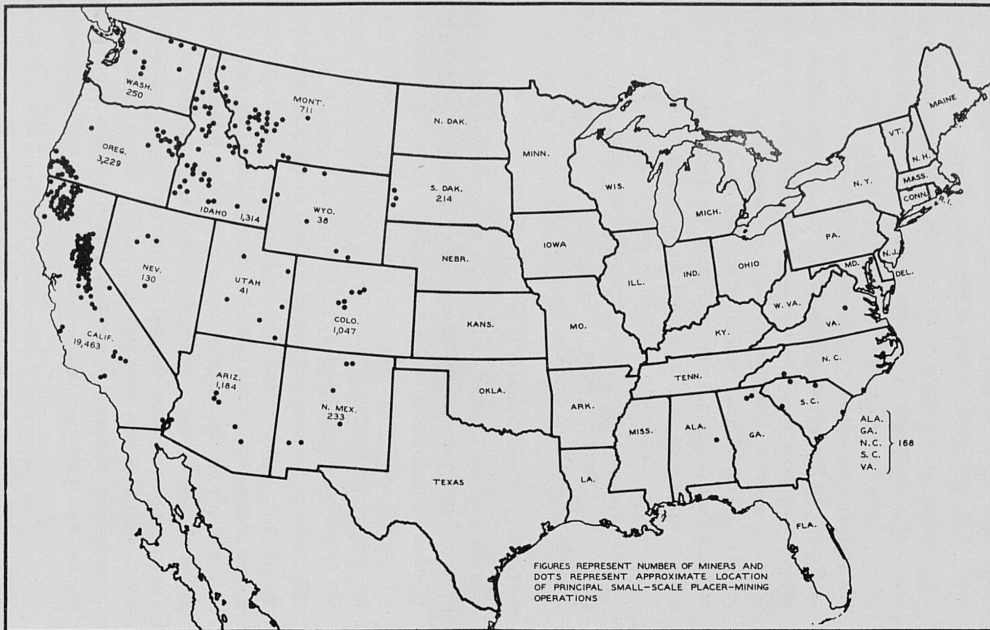
The data on the number of miners involved in the period studied (1935-37) are also reliable (see appendix D), though they are subject to two slight errors that may not quite balance. Payments to a few miners who sold stolen gold are included, thereby slightly raising the number of miners and the average recovery above the correct figures. On the other hand, many partnerships and families are engaged in small-scale placer mining, and when they sell gold they usually report it as being mined by one person; thus they report fewer miners than were actually engaged. The net result of these two errors will be a slight understatement in

⁸A copy of the schedule used as a guide in interviewing miners is presented in appendix C.

⁹Statistics in figure 4 are from table B-1; F. W. Johnson, *Federal Placer-Mining Laws and Regulations* (U. S. Dept. Int., Bur. Mines I. C. 6611R, Feb. 1938), pp. 1-5; and Merrill, Henderson, and Kiessling, *loc. cit.*

¹⁰For a brief description of small-scale placer mining in other States, see Merrill, Henderson, and Kiessling, *op. cit.*, pp. 22-40.

Figure 4.- LOCATION OF PRINCIPAL SMALL-SCALE PLACER-MINING OPERATIONS AND NUMBER OF MINERS REPORTED WORKING IN 1935*



*SEE FTN 9

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the number of miners reported working in 1935. The amount of output per miner is also shown. The amount of output per miner is also shown. The amount of output per miner is also shown.

the number of miners involved and a slight overstatement of earnings per miner.

The amount of gold recovered and sold (that is, the miners' total output) and the number of men involved appear to have been reported accurately by the Mint questionnaires; less reliance can be placed on the amount of time reported as spent at small-scale placer mining because the questionnaires as filled out by the miners and gold buyers frequently report elapsed rather than working time. In some instances there may be a sharp discrepancy between the two. For example, a miner may be reported as having mined a given offering of gold in the period of June 15-30, but he may have spent only half the working days of that period in actual mining and spent the other half helping farmers, working in town, or loafing. The record would give no clue to the actual number of days or hours of actual mining but would indicate only the period during which mining was carried on.

Not only is elapsed rather than working time usually reported, but the data on elapsed time are not quite so reliable as the figures on the amount of gold recovered and the number of miners involved. The miners are inclined to round out the time they report as having worked. Since gold is usually brought in at short intervals, the rounding out of the short periods will result in some lengthening of the actual time when it is translated into reported time.¹¹ For example, a miner may work from May 10 to May 20 and report that he spent about 2 weeks mining, or he may work from May 10 to May 31 and state that he spent about a month mining. Such overstatements can be checked when they are made by miners working steadily. If a miner who sold gold on May 10 and then brought in more gold on May 31 said that he had spent about a month recovering it, the record would show that he could not have spent more than 3 weeks. But such overstatements cannot be discovered when they are made by miners who work only intermittently or casually. The effect of miners reporting elapsed rather than working time, and of using estimates rather than exact records in making their reports on elapsed time, will therefore tend to exaggerate somewhat the length of time reported as having been spent mining on the creeks, particularly for the miners who worked intermittently.

A table (B-7) giving the distribution of working time shows the proportion of men working 1 month or less, from 1 to 6 months, and more

¹¹Here, again, there will be partly compensating factors. Time spent in moving or in prospecting, for example, frequently was not reported, and the slight overstatement of earnings will counterbalance to a small degree the overstatements of time worked.

FIGURES REPRESENT NUMBER OF MINERS AND
DOTS REPRESENT APPROXIMATE LOCATION
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than 6 months. The overstatements as to actual time spent probably reduced the proportion of men reported as working 1 month or less by a small amount, and they may have increased the number reported as working from 1 to 6 months and more than 6 months.¹² For the purpose of this classification, however, the discrepancies between the estimated elapsed time and the actual elapsed time have an unimportant effect.

Reliability of Interview Data

For all practical purposes the Mint questionnaires included all small-scale placer miners. Interviews could not, of course, be as complete in their coverage, but answers to most of the questions asked in interviews were procured from over 200 of the 12,000 small-scale placer miners who obtained gold in California. These 200 represented a much larger proportion of the men who are taking small-scale placer mining seriously than might have been anticipated. There probably were fewer than 550 men in the country who spent over 6 months of 1937, and fewer than 150 who spent over 9 months of 1937, at small-scale placer mining.¹³ Over 20 percent (113) of these 550 and over 35 percent (53) of these 150 miners were interviewed. The sample was therefore quite large as far as the men who spent over 6 months at the creeks are concerned; and they are the men to whom placer mining is important and who are important to small-scale placer mining, for they recovered most of the gold mined through small-scale placer-mining operations. The miners in whom the study was most interested are those best represented in the sample.

The interviewers found a very large proportion of the men who spent over 6 months of the year at the creeks, but they found less than 0.5 percent (70) of the approximately 17,500 miners in the United States

¹²These broad classifications were used, in part, to reduce the element of error caused by this exaggeration of the time worked. The only cases in which errors would affect this table are those of the borderline miners. A miner reported as having mined during a 5-week period when he had actually mined only during a 30-day period would be put in the over-1-month and less-than-6-month grouping when he should have been in the 1-month-or-less grouping. But less than 10 percent were reported as having worked from 1 month to 5 weeks; so that even if as many as half of these men did not actually work over 1 month but stretched their reported time and if the figures were corrected for this error, the proportion of those working less than 1 month would be increased only 5 percent, or from an apparent 53.6 percent to an actual 58.6 percent of the total. Only 1.2 percent of the men reported that they had worked between 6 and 7 months. If half of these men had actually worked less than 6 months instead of between 6 and 7 months as reported and the figures were corrected for this discrepancy, only 0.6 percent would be added to the 1- to 6-month grouping. If half those who were reported as working from 6 to 7 months had worked less than 6 months, the percentage left as working over 6 months would drop to 2.6. This means that possibly less than 3 percent of California miners had worked over 6 months of the year at placering in 1935-37, instead of the figure of 3.2 percent shown in table B-7.

¹³The estimate of the number working 1, 3, 6, and 9 months in the United States was based on the proportion of the total in the years 1935-37 working those periods in California and on the relationship between the total number of small-scale placer miners reported for the State of California and for the United States for 1935 (see tables B-1 and B-7).

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who spent less than 6 months at the creeks.¹⁴ It would have been preferable to have had a larger sample of the men who spent but a short time at mining, but 70 interviews were enough to provide some information on these short-time workers. As it is impossible to give much statistical information about them on the basis of so few interviews, the chapter discussing these data is presented in general rather than in statistical terms.

The interviewers succeeded in getting information about the men themselves - where they came from, why, how many hours a day they worked, what outside incomes they had, whether or not they had dependents, etc. After allowances were made for the relative sizes of the samples of the different classes of miners, the data proved quite useful as a suggestive though not always conclusive body of information. They were used in that fashion in the preparation of this report.

SUMMARY OF FINDINGS

Small-scale placer mining has certain advantages for the able-bodied unemployed. It provides a meager income to a few without requiring much in the way of training or capital. It enables them to work at any time without going through the sometimes hopeless process of finding an employer. And, in addition, mining has given many who took it up seriously a new sense of self-reliance, of independence, and of initiative. Such results have had a salutary psychological effect on many unemployed during hard times.

To a few who have mined only intermittently and who have relied on the creeks to augment their incomes from other sources rather than to provide them with a living, placering has proved particularly helpful. It has enabled many men, together with their families, to have some occupation between jobs, and it has contributed more to the welfare of these individuals than the small financial returns might suggest. And to a very small proportion of the few who have stuck to the creeks fairly steadily, placer mining has proved profitable.

¹⁴This large representation of miners who spent over 6 months of the year on the creeks was not obtained by any selective process but by pure random-sampling methods. Any good random sample of the number of men on the creeks at any particular day would include a relatively high proportion of men spending over 6 months at mining. For instance, if 50 full-time miners were working a particular creek throughout the year and in addition 50 casual miners worked it in succession throughout the year, on any particular day an interviewer would find only 51 miners on that creek and 50 of them would be full-time miners despite the fact that as many casual as full-time miners worked the stream at some time during the year. Moreover, the men who were at the streams only a short time did not have tents or cabins by which they could be located; and those who lived in nearby towns in which they could not readily be discovered were less likely to be seen and could not be covered so adequately by interviews as full-time miners.

To some who dislike discipline and authority, placer mining has proved preferable to other ways of making a living. There are men who prefer to live on 25 cents a day which they themselves earn through placer mining rather than to work for wages or to accept public aid. Placer mining has enabled such men to live their own lives to some degree at least.

Another small group to whom small-scale placering has been helpful includes men with outside incomes or pensions. These men would have had nothing to do if they had lived in the cities, but they can work as hard or as easily as they will on the creeks. Knowing that their pensions will enable them to live, they work at their own convenience and at their own rate of speed on the placer gravels, adding a little to their income and taking advantage of the fact that living costs are lower on the creeks than in town. Placer mining has enabled many retired or pensioned persons to enjoy healthful work in moderation, to increase their small incomes, and to dream of making a rich strike some day.

Men who have shown that they can live within their means and build up their equipment out of an income of a dollar or two a day can sometimes secure backing for larger placer projects that require more capital and will return at least a living wage. Each year a few men demonstrate unusual ability to placer and to conserve their resources and are able to lease good bars and equipment. Only a very few succeed in this way, but they prove that it can be done.

All the men in these groups do not add up to 5 percent of the small-scale placer miners of the country. For 95 percent of those who try to depend on small-scale placer mining for a living, it has turned out to be a delusion and a snare, primarily because earnings are tragically low. The output per man-hour from hand methods of placering on the lean bars still available is too low to support life in modest comfort. Less than half of the men who try it find enough gold to hold them at the streams over a month, and half of those who stay over a month do not remain over 2 months. Even among the better full-time miners, half appear to net less than \$7 per week. The result is that most miners follow placering only casually in the hope of having a "lucky break" or in an effort to earn an income to tide them over between other jobs.

Earnings from small-scale placer mining, which are too low to support individuals, are far too low to support a well-rounded family life. Even the more successful miners can make no provision for medical attention, good clothing, social life, reserves for emergencies, facilities for recreation, and other such needs. The small-scale placer-miner's family lives at a bare subsistence level and from day to day. The uncertain nature of the work - owing to the fact that the gravels at any

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particular point may give out at any time and force the family to move - has the further disadvantage of discouraging provision for suitable or permanent dwellings and the making or purchasing of furniture or household equipment. This aspect of placering also makes it particularly difficult for children to be educated satisfactorily.

Children are given very limited educational facilities in the mountain counties at best. When they are reared in tents and shacks and are moved from creek to creek, they have access to poor schools only and cannot hope to receive an education equivalent to that given children of more settled families in the more populous sections. They are handicapped in many other ways. Diets are unbalanced, medical facilities hard to secure, and social contacts scarce.

Finally, families find conditions discouraging because the community life is so unsatisfactory. It is quite different from that of the original pioneers or even of farm families. Pioneers and farmers feel that they own the land and are developing it; they are the people who count; they are the community, and they are able to make a community life of their own even with very limited physical facilities. But the placer miners are temporary interlopers. They own no land and are not developing the area; they are living off, or at best in, the community, not as part of it, and they do not have the resources with which to make a life of their own nor with which to purchase an entree to the life of the community in which they are living. Family and social life are very circumscribed.

Not only is the life of the small-scale placer miner unsatisfactory at present, particularly if he has a family with him, but the future probably will bring a declining level. Small-scale placer mining in the United States now provides fewer than 6,000 men with an average recovery above \$3.50 per week gross for more than 1 month out of 12, and it supplies fewer than 350 men with that recovery for more than 6 months out of 12. Unless there is a sharp upward change in the price of gold, it probably will provide fewer and fewer men with even this much income and for shorter and shorter periods each year.

These facts demonstrate that statements like the one made in United States Bureau of Mines Information Circular 6611, published as early as April 1932, to the effect that "there is little chance for the man unfamiliar with placer mining, unused to hardship, and lacking experience in 'roughing it'" are very temperate, for not only are the chances all against unskilled men, but also they are not good for skilled men, and the communities to which they move suffer as well.

CHAPTER II

ATTRACTIONS OF SMALL-SCALE PLACER MINING

A few men, it has been seen, have been eking out a livelihood at small-scale, manual placer mining for years and were living witnesses that under certain conditions the creeks provided some income. Actually there were several ways in which gold-bearing streams were suited to the needs of unemployed men, the principal advantages being the facts that they required a minimum of training, very little capital, and no employer.

MINIMUM TRAINING REQUIREMENTS

Small-scale placer mining for gold requires only a minimum of training, but it does require training. One part of gold in 10 million parts of sand and gravel is considered a rich find, and as an unemployed man does not have an inherited instinct that tells him how to separate this one part from the 10 million that envelop it, anyone who tries his hand at small-scale mining without this needed minimum of instruction is almost certain to fail. Several of the Western States and the Federal Bureau of Mines attempted to provide some class instruction or information in bulletin form to aid the men migrating to the gold-bearing areas, and such instruction proved very helpful. Of even greater help to many of those who joined the new gold rush were the old-timers who for decades had practiced small-scale placer mining between other jobs and who were willing to teach the newcomers the elements of the work on the spot. Had it not been for the instruction given by public agencies and for the first-hand help of these old-timers, the experience of the unemployed who were trying their luck on the streams would have been much worse even than it was.¹

¹A description of panning and of other small-scale placer methods, including rocking, the use of long toms, surface washing, and sluicing, is given in appendix A. Panning is the first step in locating gold. It is a tricky but simple operation by which a small amount of gold-bearing material is tested in a pan (see frontispiece). Even this relatively simple operation requires skill and takes time to master. If a sample tested leaves enough gold in the pan to indicate that the bar will be profitable to work, more elaborate equipment - such as a rocker, long tom, or sluice - is usually set up. All of these devices require skill for efficient operation under varying conditions. They take advantage of the fact that the specific gravity of gold is 6 to 10 times that of the material with which it is mixed and 16 to 19 times that of water; so if the entire mass is shaken and washed, the various ingredients are segregated by specific gravity and the heaviest material - gold - will be found by itself at the bottom. The other materials may then be thrown away.

One cause of failure by unskilled panners is overestimation of the content of gold. It may take 300 colors (flakes of gold) to make 1 cent; 100 colors appear attractive to the untrained.

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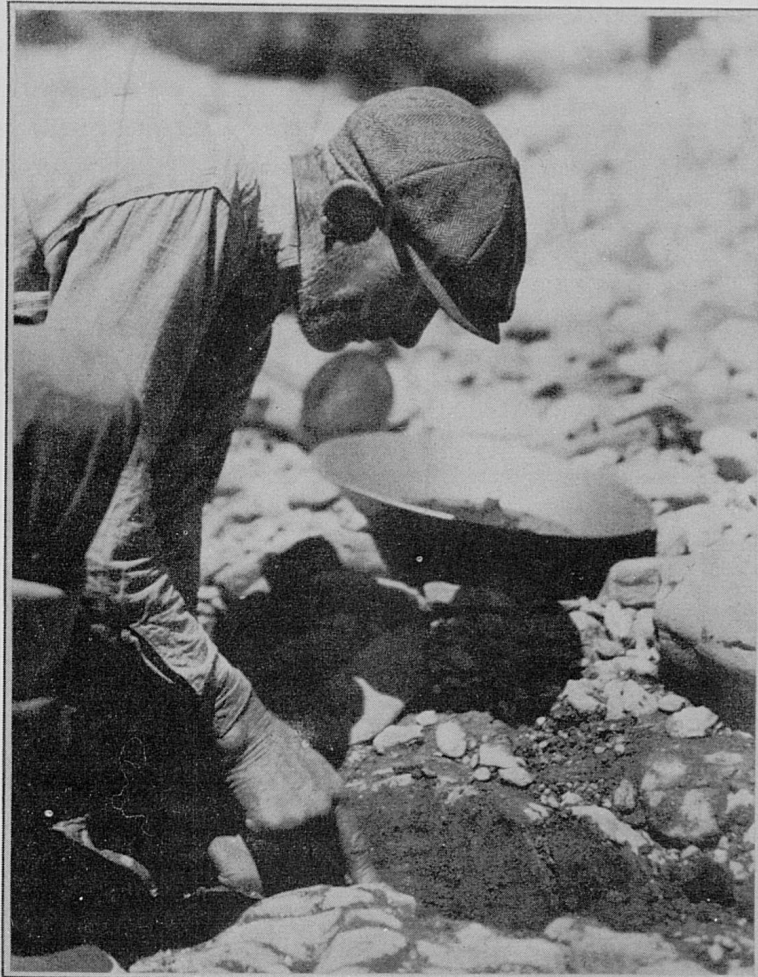


FIGURE 5.— AN EXPERIENCED MINER CARRYING ON A SPECIAL TYPE OF PLACERING

Successful placering requires a practical knowledge of the character of gold deposition and skill in the use of simple mining equipment. The miner shown above is scraping gravel from a crevice in the bedrock of a creek preparatory to panning. The crevices in bedrock act as natural riffles to collect the gold from the gravel that is carried over them during periods of high water.

A small amount of training will enable anyone to recover some gold from auriferous gravels, but much training is required for the recovery of a maximum amount of the fine gold with a minimum of effort, and still more is necessary for finding the richest bars in the shortest time. Few miners have acquired the ability to locate the relatively rich bars. Many of the old-timers who have been panning for decades have the knack to some degree, but the men who came to the streams during the depression could not acquire it in a few weeks or even months of work. Consequently, two men living in adjoining tents and working equally hard frequently have had widely divergent earnings because one was much more skilled at locating relatively rich spots and in using equipment and

techniques best suited to each particular gravel bar. Even a relatively skilled miner might work gravel carrying 50 cents to the yard when a few feet away gravel that appears identical would run a dollar a yard. The ability to realize that such a difference might exist, and to know that it would be worth panning some of the gravel a few feet away in a particular direction in order to find out if it ran better than the gravel that was being worked, might therefore double the earnings of such a miner. If, as often happens, one man is able to work twice as much gravel as his neighbor and to work it more efficiently because of better equipment and training, and if he picks out this richer bar, his more efficient operation of the better gravel would yield him several times as much gold per hour as the slower working of the poorer gravel would yield his neighbor.

Many instances were observed at first hand where selection of working places and possession of efficient equipment resulted in even greater differences between recoveries of miners. On the other hand, refusal to work anything but high-grade gravels is not always wise, for a miner may lose more time and gold by hunting too persistently for extremely rich bars than he would by working poorer bars of whose existence he already is aware.

SMALL CAPITAL REQUIREMENTS

Little capital is required to start work by hand methods on most gold-bearing bars. Owners are often sympathetic toward men desperately trying to support themselves and frequently are willing to let them placer on the poorer gravels without charge. Such beds usually would not be worth working by the owners but will yield small returns to an itinerant worker, and the owners have little to lose as a result of their generosity. While access may be secured to poor bars in this fashion, the richer bars are closely guarded and cannot be worked unless they are purchased or leased; a lease may be difficult to get unless the prospective miner can present evidence that he is responsible. This means that workable but not rich bars may be mined without any outlay of capital for purchase or rent - a factor of major importance to the unemployed - and one of the reasons why such a large number drifted to the gold fields.

The equipment required by small-scale operators is simple. It includes such items as a pick and shovel, a rocker, and a sluice box or a tom.² To obtain the last-mentioned item, a miner must either find

²Toms are variously named, depending in large part on how they are used. If used in connection with a pump, for instance, they may be called "pump toms;" the most common name is "long tom." For a description of a long tom see appendix A.

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suitable free lumber and scrap material and have the skill to make the necessary equipment from them, or he must lay out a small amount of capital. A fully equipped rocker can be purchased for \$12 and can be built for less, and picks and shovels are relatively inexpensive. Many of the new miners, as well as the old-timers, have shown surprising ingenuity in building efficient equipment from scrap. Abandoned equipment could be picked up on some of the creeks after 1932 as the disillusioned would-be miners left the country.

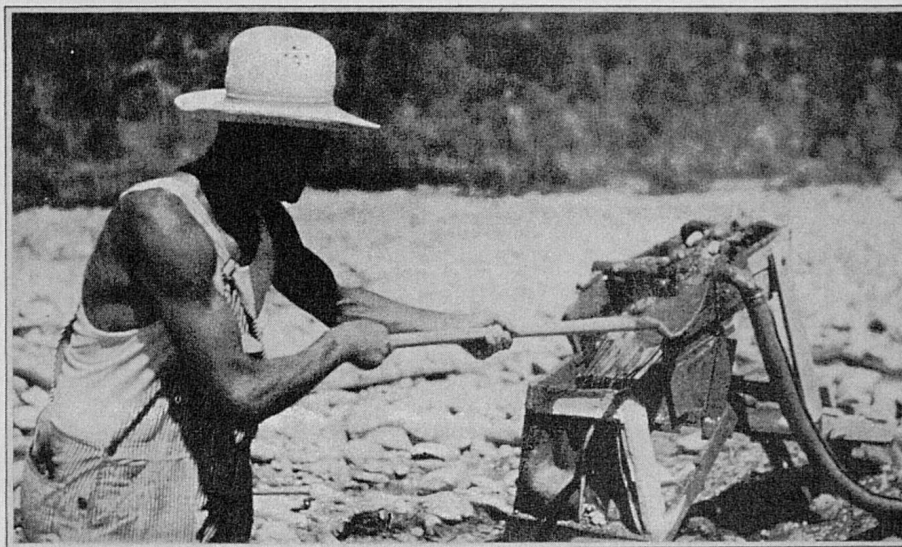


FIGURE 6.— PUMP TOM IN OPERATION

Miner shoveling gravel into a pump tom where it is washed with water delivered from the creek by a pump driven by a small gasoline engine. Devices such as the pump tom, long tom, rocker, and dip box greatly increase the quantity of gravel that a man can work in a day in comparison with panning.

A few of the more successful (possibly a third of the full-time miners) purchased small gasoline engines and centrifugal pumps for working bar gravels.³ This equipment enables a miner to concentrate on shoveling the gravel and to avoid spending as much as half of his time carrying water. The expenditure of \$50 to \$100 for such equipment and the purchase of a gallon of gasoline a day will sometimes enable miners to double their daily output. Some men have acquired old-fashioned washing-machine engines for little or nothing and have made them work successfully. Many pumps were second-hand when purchased. In some instances, particularly in the more mountainous areas, the equivalent of a pump has been acquired without any outlay of capital by the building of wing dams and sluices.

³Such a combination is called a pumping engine on the creeks. For a description of such methods see appendix A. Estimates are based on information obtained from the interviews.

The only other major capital outlay made by any portion of the miners was for automobiles. Seventy percent of the miners interviewed owned or shared ownership in an automobile. The cars were old and very cheap, but they represented a major capital outlay to their owners.

NO EMPLOYER NEEDED

The third factor that operated to the advantage of the prospective small-scale placer miner was the fact that he did not have to find an employer in order to start work. It was unnecessary for an unemployed worker who wanted to try his luck in the stream beds to convince an employer that he was a steady worker, knew his business, and was going to work a profitable bar. If it had been necessary to overcome these and other like obstacles that confront the job seeker in some factory or other business concern, small-scale placer mining would not have expanded as it did. Instead, it was necessary for the man with some training who decided that he was going to try his luck at gold mining to do no more than find a gravel bar, acquire his simple equipment, and start work at his own convenience. A little training and capital were necessary, but not the consent of an employer. This recalls pioneer conditions but represents a relatively rare phenomenon in present-day industry.

Many small-scale miners find that this absence of an employer has done much more than make the jobs possible; it has made the jobs enjoyable. It has given men a new feeling of self-reliance and of independence. Some are willing to accept a considerable financial sacrifice to remain their own masters rather than to work for someone else. They get real pleasure out of being able to start when they wish, work as long as they desire at their own rate of speed, and stop when they please. This independence has undoubtedly been of psychological benefit to many men.

The best part of this absence of employers, for the good miners at least, is not the fact that none are needed on the gold-bearing streams to hand out jobs; it is the fact that the men can get paid without an employer and at a fixed rate. Moreover, unlike the wage earner, the placer-miner's income increase is more nearly commensurate with his increased skill and efficiency. The miner gets the full value of any improvements in his methods or increase in his speed. From 1929 to 1932 the Federal Government stood ready to pay \$20.67 for each fine ounce of gold mined; in 1933 it paid an average of \$25.56; in 1934, an average of \$34.95; and from 1935 on it has stood ready to pay \$35.

This willingness to buy an unlimited amount at a definite price is in sharp contrast with the situation that is found in agriculture or in most forms of business. If the farmers of the country produce an exceptionally large supply of corn, they usually expect to see the price

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drop; if too much of any industrial product is produced, the price must be reduced, demand stimulated, or some of the product withheld from the market. But this law of supply and demand does not hold for gold miners. They may produce as much as they can, knowing that the market is always there and the price certain. Gold miners need not worry that their jobs will disappear because of a declining or saturated market.⁴

This gives the highly skilled miner, at least, a feeling of security that he may not find in industry. He knows that he can always find workable bars, even if they are only small ones. After testing a particular bar, he may feel sure that for every yard of it he works he will find about 62 cents in gold (an actual illustration).⁵ He knows that if he sluices 3 yards in a day he will recover gold worth about \$1.86, or that if he works in a leisurely fashion and moves only 1 yard he will find gold worth around 62 cents. If he is working an untested bar, he will not know how much to expect until he has worked the bar for a while, but he can be certain of finding at least some gold and of having a market for the metal found.

The unskilled miner is not benefited greatly by this definite price of gold because there is too much irregularity in his day-to-day recovery of precious metal. One week he may average 100 medium colors⁶ - worth \$1.40 - per day, and the next week he may average 10 colors, worth 14 cents. The uncertainty of recovery by the unskilled newcomers far outweighs the advantages inherent in a fixed price for their product. It is only the relatively few, highly skilled miners who are fairly certain of averaging a definite amount of gold each month who can have any feeling of security with respect to their earnings.

THE GAMBLING ELEMENT

While the miner is shoveling his gravel through his equipment, there is always a possibility that he will stumble on a nugget or find a rich bar. A bar may run 62 cents to a yard, day in and day out, but someday it may yield a fortune. The million-to-one chance against him does not seem to deter the miner from dreaming that his next clean-up will

⁴As for all who use money, however, changes in the purchasing power of gold will affect their real income. This fact is particularly important to gold miners because the price of their product, gold, is fixed, while the cost of their raw materials or their food and clothing may rise. See A. V. Corry and O. E. Kiessling, *Mineral Technology and Output per Man Studies: Grade of Ore* (WPA National Research Project in cooperation with U. S. Department of the Interior, Bureau of Mines, Report No. E-8, Aug. 1938), p. 32.

⁵This may sound like rich gravel to those acquainted with the gold content of gravels mined with costly power equipment. It is not unusually rich for small, scattered bars mined by hand. Machine mining might exhaust such a bed in a few hours or even minutes; so it would not pay for even the cost of transportation of the equipment. On the other hand, hand mining would return but a few cents a day were it applied to the low-grade gravels that can be worked profitably by machine.

⁶For a description and statement of values of colors see appendix A.

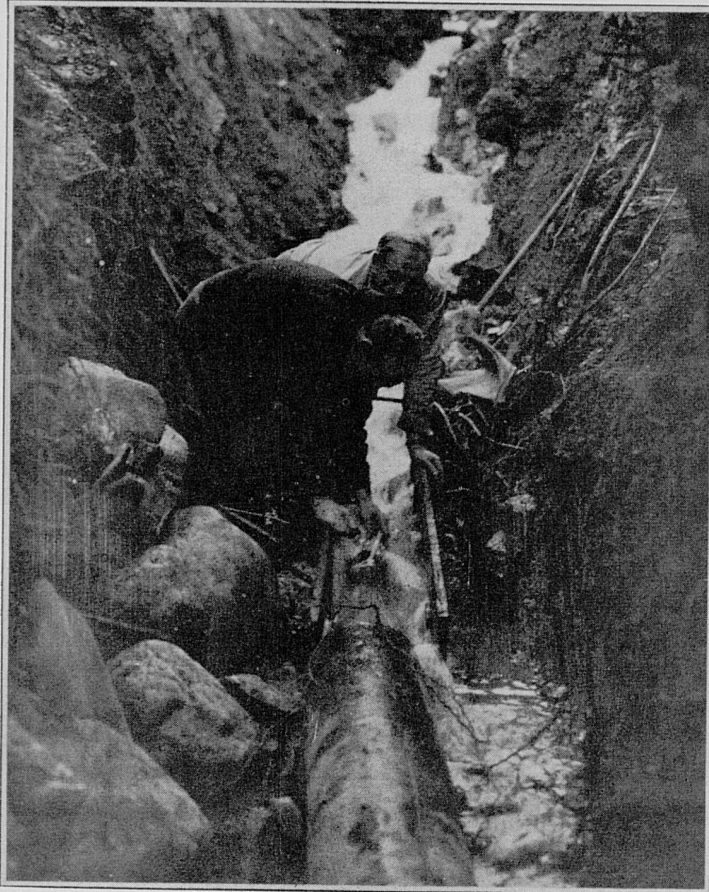


FIGURE 7.— MINERS EXAMINING RIFFLES TO SEE IF ANY GOLD HAS BEEN DEPOSITED
The possibility of making a rich strike, although remote, is always present in the mind of the miner. The men in the above view are diverting the stream of water so that they can see what has been deposited in the riffles.

reveal a strike. Miners forget the days that yield poor returns; they remember the days in which they made \$10 to \$20, and they talk about reputed strikes that have brought \$100 or \$1,000. This anticipation is a real satisfaction to the miner and one which would be difficult to measure in terms of money.

Despite the primitive conditions under which they work and live, miners often speak more favorably of their work than do men in other occupations who have better working conditions and higher incomes. The freedom incident to working for themselves and the chance of finding a nugget or a rich gravel bar hitherto overlooked present a fascination which for some men is much greater than the pecuniary return, and these factors help to make placer mining a more desirable occupation than its low returns would seem to warrant.

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CHAPTER III

UNSATISFACTORY RECOVERIES

The most striking feature of the incomes of the small-scale placer miners is that they are wretchedly low. Seventy-six percent of the miners in California who sold gold in 1935 had a total output valued at \$50 or less, and the output of 51 percent was valued at \$20 or less. These percentages did not change greatly in 1936 and 1937; as a matter of fact, slightly larger percentages of the men sold gold worth \$20 or less in 1937 than in 1935.

These annual recoveries¹ were very small, but that does not mean that the earnings during the time actually spent at the gold-bearing creeks were small. If the men who recovered gold worth \$20 during a year spent only 1 week at the auriferous bars, their output for this week would be \$20. If, at the other extreme, these men spent 52 weeks of the year in mining and recovered gold with a gross value of only \$20, the weekly output was less than 40 cents. In order to interpret these annual income figures and to understand their bearing on the problems of the men, therefore, they must first be related to the length of time spent at placering.

Owing to the fact that miners ordinarily give elapsed rather than working time when they report the length of the period spent in mining gold, it is difficult to relate earnings to number of days actually spent at mining. If there were a constant relationship between the number of days reported spent at the creeks and the number actually spent at mining, allowance could be made for the known discrepancy of the figures and per-diem earnings could be calculated. There is no such simple fixed relationship, and it is therefore impossible to compute earnings on a workday basis except by making assumptions.²

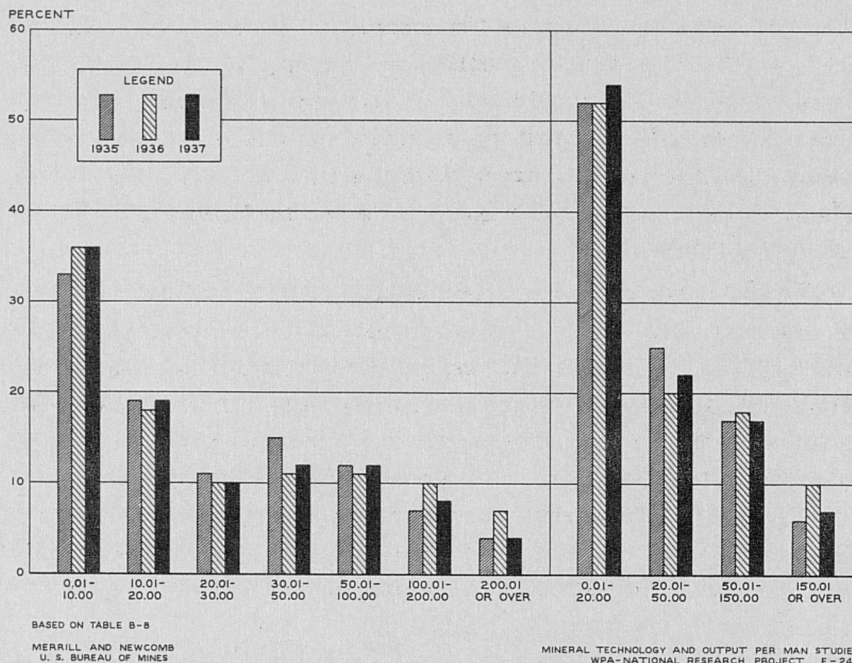
Difficulties would be encountered in any attempt to translate the available data into workday earnings even if working periods were accurately known. For instance, some miners practice crop mining.³ They

¹By the terms "recovery," "value of gold recovered," etc., is meant the gold content of the dust, nuggets, concentrates, or amalgam secured by the miners. In terms of dollars it means the value of the gold content at the Mint price, i. e., \$35 per oz. from 1935 on (the period covered by this chapter). This meaning is different from that given to the term by mining engineers, but the use of the word in this sense simplifies the presentation.

²See p. 11.

³"Crop mining" is based on a phenomenon that is not peculiar to California gold areas but which occurs more frequently there than in most placer-mining areas of the country. This phenomenon is the recurrent deposition of thin layers of [Con.]

Figure 8.- PERCENTAGE DISTRIBUTION OF EARNINGS OF
SMALL-SCALE PLACER MINERS IN CALIFORNIA,
BY DOLLARS EARNED PER YEAR, 1935-37



can work a particular bar a day or two at a time, but once the thin top layer of pay gravel has been exhausted, further work on this bar would

³[Con.]relatively rich gravels on top of existing bars. These deposits can be worked profitably by hand methods for a few hours, or sometimes days, after each high water. The fact that new supplies of gold can be taken time after time from the same bar has led to the obvious term of "crop mining." Gold, of course, does not grow in the gravel bar but is washed down from farther upstream. The relatively common occurrence of this phenomenon in California is due largely to an unusual condition existing in the streams of the State. When it became apparent about 1880 that hydraulic mining as it was being practiced would probably be stopped by a legal action (see ch. VI, fn. 5), frantic efforts were made by managers of all hydraulic operations to rush the largest possible amount of gravel through the sluices, and they were heavily overloaded. Large amounts of gold which would have been recovered under ordinary conditions went through the sluices and into the gravel dumps that were often 60 feet or more in height. Each storm and high water disturbs some of this gravel and washes a small amount of gold downstream. Some of this gold is deposited on top of downstream bars which slow up the flow of water enough to cause gold to settle but do not necessarily slow up the water enough to cause all the sand and gravel that is being carried along to drop. In other words, under certain conditions these bars act as riffles. In time, of course, this gold would sift down through the lighter sand and gravel on which it has been deposited and eventually might reach bedrock; but if the thin deposits are worked at once (before rains and the stream have started to wash the gold into the top gravel on which it rests), this gold may be recovered with a small effort. Minute amounts of gold from concealed lodes are also being washed down, but the amount of gold brought down from such sources is not enough to enrich tops of most bars appreciably during high waters. Another phenomenon which occurs in California, owing to the heavy flow of water carried by many streams in the spring, is the washing off of tops of some bars and the occasional exposure of relatively rich layers of gravel. Such an occurrence sometimes enables men using hand equipment to recover gold from gravels that would not have proved profitable if it had been necessary to remove the top lean gravels. This phenomenon does not often recur on the same bar, and while the exposed gravels bear a superficial resemblance to re-sorted crop-mining gravels, they are the result of a quite different action. Re-sorting, owing to flood conditions, has been an important factor in California streams.

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yield little or nothing. Such miners may be able to make \$5 per day for an average of 2 days per week, or \$10 per week. If they worked any of these bars the other 5 days, they might earn not more than 5 cents in each additional day worked. Their workweek would therefore be 2 days,⁴ but to say that their daily earnings are \$5 would be to give the misleading implication that if they worked 7 days a week their earnings would be \$35.⁵

The use of weekly recovery figures avoids many of these pitfalls, permits the use of reported rather than estimated data, and gives a more useful concept of the actual output of the miners. If a miner works 5 weeks at the creeks and has a total recovery of \$75, for example, he must live on the proceeds of the sales of an average of \$15 worth of gold a week, irrespective of whether he worked 1 day per week and made a recovery of \$15 per workday, or whether he worked 7 days per week and had a recovery of \$2.14 per workday. The analysis of earnings made in this study is therefore based on reported average weekly recoveries rather than estimated daily gold recoveries.

A condensed tabulation of the distribution of weekly recoveries by size and for each type of miner - the casual, the intermittent, and the full-time operator⁶ - is given in table 1.

Table 1.- DISTRIBUTION OF OUTPUT, BY ACTUAL WEEKLY EARNINGS AND TYPE OF MINER, 1935-37

Earnings	All		Casual		Intermittent		Full-time	
	Percent of total	Median	Percent of total	Median	Percent of total	Median	Percent of total	Median
\$0.01-\$3.50 ^a	36	\$2.00	30	\$2.25	42	\$2.00	40	\$1.75
3.51-10.50	35	6.23	37	6.37	34	6.02	44	6.23
10.51 or over	29	19.25	33	19.46	24	18.76	16	16.24
3.51 or over	64	9.52	70	10.15	58	8.89	60	7.49
Total	100	5.60	100	6.65	100	4.55	100	4.69

^aThe medians for this group were estimated, as the tabulation of the data was not made with a sufficiently fine break-down to permit accurate computation.

Two qualifications should be borne in mind in examining this table. First, it reports income from mining only, and not necessarily the total income of the miners. Casual and intermittent miners form an important labor reserve throughout the placer areas. Since they usually can make more money by working for the farmers than by mining, most of them are glad to take time off from placering whenever there is a chance to do

⁴This would not be true for all crop miners since some of them work leaner bars between periods of crop mining.

⁵For a discussion of the length of the workweek see ch. VI.

⁶For a description of these classes of miners see ch. IV.

farm work. Many of these men may have recovered gold worth \$4 per week, for example, but their income from farm work may have been an additional \$5 per week. Under such conditions it would not be accurate to say that all the miners with an output ranging from \$3.51 to \$7.00 per week must live on the proceeds from the sale of that much gold. Their total income is not revealed by the Mint figures. This discrepancy between earnings from mining and total earnings will be discussed in greater detail when the earnings of those miners who do outside work are considered.

The second qualification is that this table does not reveal gold recovery on a workweek but on a calendar-week basis. It shows what is done, on the average, per calendar week, but, because the average includes so much part-time work (2-, 3-, and 4-day workweeks), it does not make possible a comparison of the earnings of those among the various classes of miners who work steadily. It shows, for example, that 40 percent of the full-time miners have a total output of \$3.50 or less per calendar week, as compared with 30 percent of the casual miners (men who work 1 month or less each year). This does not mean that an average casual worker coming to the streams and operating only a few days has a better chance to recover above \$3.50 per week than a competent full-time miner, with more equipment and skill, who works steadily. It means only that, on an average, casual miners (who work rather steadily while they are at the creeks) earn more per calendar week than full-time miners (who put in a short workweek).⁷ In other words, the averages do not reveal what competent miners can do.

Table 2 was computed to supplement table 1 and to make it possible to study the earnings of miners in each class who work steadily. This table gives estimated earnings on a full workweek basis and is therefore more useful than table 1 for comparing the earnings of the various classes of miners to see what can be done by men who put in a full workweek. Table 1 shows the recovery of all miners, including those who work but a few hours each week and those who are physically or otherwise handicapped; table 2 shows what is done by those who work steadily. The two tables together give a more complete story than either alone.⁸

In preparing table 2 it was assumed that those miners who worked the standard week were otherwise average miners in each class. If, for example, the output of a particular group which worked an average of 20 days in 5 weeks was \$8 per week, it was assumed that the earnings

⁷This is discussed more fully in the next chapter. It is due in part to the large proportion of full-time workers who have disabilities such as a physical handicap.

⁸A description of the method used in computing the estimates of earnings on a full workweek basis is given in appendix D. The estimates are based on first-hand comparison of the earnings of miners who work steadily with those of the average type of miner.

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Table 2.- DISTRIBUTION OF OUTPUT, BY ESTIMATED FULL-TIME WEEKLY EARNINGS AND TYPE OF MINER, 1935-37^a

Earnings	All		Casual		Intermittent		Full-time	
	Percent of total	Median	Percent of total	Median	Percent of total	Median	Percent of total	Median
\$0.01-\$3.50	30	\$1.75	35	\$2.00	25	\$1.75	15	\$2.00
3.51-10.50	48	6.23	35	6.37	51	6.02	70	6.23
10.51 or over	27	19.18	30	19.53	24	18.76	15	18.24
3.51 or over	70	8.61	65	9.80	75	7.77	85	6.93
Total	100	6.02	100	5.88	100	5.95	100	6.23

^aFor explanation of the methods used in computing this table see appendix D.

of those among the group who worked 5 full workweeks, or 25 days, would be \$10 per week. The table therefore serves a dual purpose. It shows the estimated actual output of men who worked 5 days out of each 7 they reported spending at the creeks, as well as the estimated potential output of miners not physically handicapped or engaged in crop mining had they worked 5 days each calendar week instead of 3 or 4 days or whatever time they did spend. In this respect it supplements table 1 by giving possibilities where table 1 gives actual averages.

An approximate figure for workday recoveries can be found, as a general rule, by dividing the workweek figures by 5 (the length of the average full workweek),⁹ but for any particular type of miner this calculation may be useless or even misleading. Tabulation of the data in the schedules sent to the United States Mint by the bullion buyers of California shows that the median recovery per calendar week in 1935-37 for all California miners came to \$5.60.¹⁰ Closer examination of the data suggests that a better understanding of the figures will be possible if the miners are divided into three groups, each containing roughly one-third of the total, and if three medians are used instead of one. These three groups include men producing gold worth \$3.50 or less per week (36 percent of the total), \$3.51 to \$10.50 (35 percent of the total), and over \$10.50 (29 percent of the total).

The median recovery of the poorest paid group is about \$2.00; the median of the middle group is \$6.23; that of the highest paid group

⁹For a discussion of the length of the workweek see ch. VI.

¹⁰Arithmetic averages proved too misleading to warrant their use, and it was necessary to base the examination of the earnings data on medians rather than on means. The following illustration will suggest how the distribution of earnings affected averages in such fashion as to make them unsatisfactory:

If seven miners are working a creek and one makes \$4, one \$5, three \$6, one \$17, and one \$40 per week, the average recovery is \$12. The one miner who made the very unusual recovery of \$40 made the average very high, and this average is not indicative of what a representative miner might be expected to make. The median miner, who was in the center of the earnings group, made \$6 per week, and \$6 rather than \$12 is what an average miner on this creek might be expected to make. Means of the figures reported to the Mint were frequently twice as high as medians.

(mostly short-time miners), \$19.25 per week. The median of all three groups is \$5.60, and of the two upper groups (which include 64 percent of the total), \$9.52. A gold recovery of \$6.23 per week may therefore be considered as fair; a recovery of \$9.52 may be considered as good; and a recovery of \$19.25 may be considered as excellent even when the recoveries of the miners who work the streams at the most advantageous times are calculated together with the recoveries of full-time miners.

The men in the lowest output group represent primarily, though not entirely, the untrained, unequipped, physically handicapped, pensioned, or otherwise submarginal miners. The reasons why this group is so large (36 percent of the total) will be discussed in greater detail in chapter IV, but its size is due in part to the fact that it contains men who are unequipped or untrained, or men who cannot compete on even terms for jobs available in the cities and who drift to the mines because they do not have to pass any tests or be hired by an employer in order to work. The men in the second group are largely those with some training, skill, strength, and equipment, plus average luck. The men in the last group are principally men with much better than average equipment, skill, and luck, and local men who have access to the richer gravels from which most miners are barred. Very few of those in this third group spend much time at the creek beds, and their relatively high recovery of over \$10.50 per week may be due as much to the fact that they spend some time at the better gravels or work at more favorable times as to their superior skill and equipment.

The factor of the length and selection of time spent at the creeks cannot be ignored in studying earnings. Because a recovery of \$9.52 per week appears to be a median recovery for all except the submarginal miners, it cannot be assumed that a full-time miner who has better than average equipment and training can be expected to have an output of \$9.52 per week. As a matter of fact, about 80 percent of them produce less than this (see table B-9), and the median recovery of all full-time miners, on a calendar-week basis, is 16 percent below that for all other miners. There are a larger proportion of them who recover less than \$3.50 per week and a smaller proportion who recover more than \$10.50 per week than are included in these classifications for other miners. The miners who should be most skilled have the poorest record for high earnings. In other words, general figures have relatively little significance, and in order to understand the situation it becomes necessary to examine the records separately and in detail for the casual, the intermittent, and the full-time operator. The next chapter, accordingly, will examine the various classes of miners and their recoveries in order to see why their outputs vary so greatly.

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CHAPTER IV

TYPES OF SMALL-SCALE MINERS AND THEIR INCOMES

The largest group of would-be miners consisted of those who sold no gold at all.¹ In the early 1930's, for every miner who had some success in finding gold, there were probably at least five men who were completely unsuccessful. This proportion dropped sharply after 1933, and by 1937 probably four out of every five who tried mining found some gold. Among those who did find gold, over half (53.6 percent in 1935-37) were "casual" miners, men who spent not over 1 month at mining. The next group were the "intermittent" miners, men who spent 1 to 6 months at placer mining. Over 40 percent of those finding gold (43.2 percent in 1935-37) were in this group. The last group, the "full-time" miners, i. e., men who spent over 6 months at the creeks, was very small indeed. Only 3.2 percent of those who found gold from 1935 to 1937 in California were reported to have worked over 6 months (see table B-7), and, as pointed out in the first chapter, their number may have been somewhat exaggerated in the reporting.

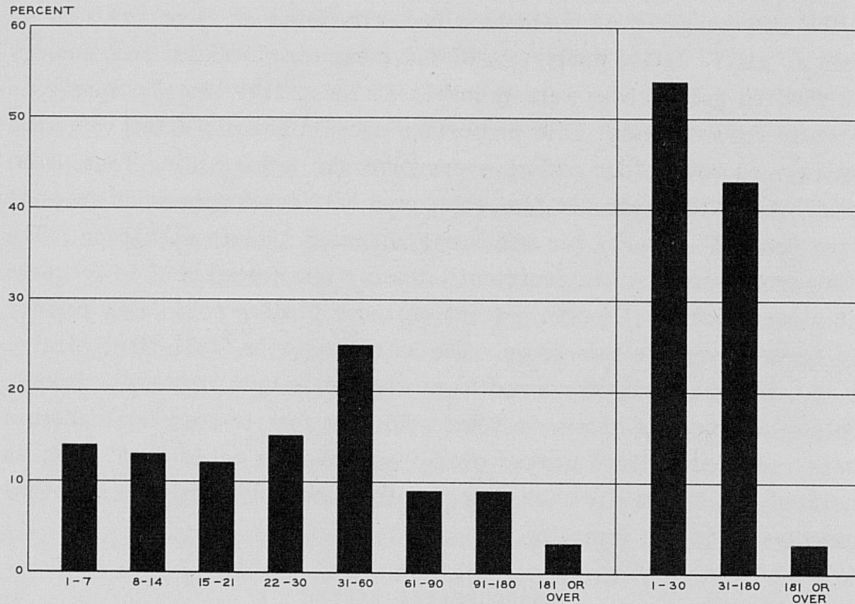
UNSUCCESSFUL MINERS

Most of the would-be miners left the gravels after a very short trial, particularly through 1933. They were not all itinerant workers in the sense that they were men who always wanted to be moving on. Many of them came to the creeks seeking steady incomes and permanent jobs, and they came hoping to make a living but failed to do so because of lack of mechanical ability, training, luck, or, occasionally, the type of fortitude necessary for pioneer living. This proportion of miners failing to find gold has been declining as the real facts regarding earnings have become better known and as the immigration of unskilled and unequipped men has declined.

The auriferous streams of northern California flow into some of the great agricultural lands of the State. It is easy for agricultural workers to drive a few miles to some known placer area, spend something for a pan and a shovel, and try their hand at placering. Consequently, it is to be expected that as long as harvesting wages are low and the work seasonal there will be many men who will take a little time off in their travels, sometimes as much for the fun of the gamble as for the returns. The apparent 1937 ratio of one person not finding gold

¹See fig. 2. A few probably found small amounts of gold which they did not sell but held as keepsakes.

Figure 9.- PERCENTAGE DISTRIBUTION OF SMALL-SCALE PLACER MINERS IN CALIFORNIA, BY NUMBER OF DAYS IN WORKING YEAR, 1935-37



BASED ON TABLE B-7
MERRILL AND NEWCOMB
U. S. BUREAU OF MINES

MINERAL TECHNOLOGY AND OUTPUT PER MAN STUDIES
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to four finding it, therefore, probably cannot be expected to drop much, and it does not signify that large numbers of men are desperately seeking gold as their only hope of making a living. It means, rather, that urban and rural employment conditions are still not such as to deter men from taking a chance that they may find a few nuggets or at least make as much in a few days by working for themselves as by harvesting fruits or vegetables.

CASUAL MINERS

Description

Over half (53.6 percent) of the small-scale placer miners who do find gold are casual miners, men who work at the creeks not more than 1 month out of the year. About half of this group, or a quarter of all miners, work 2 weeks or less (see table B-7). The casual miners are a very heterogeneous class of men: itinerant workers who stop off on their way to some harvest field and who are fortunate enough to find some gold; families and individuals who live in nearby towns and do a little mining over the week ends or while on trips; men on vacations; and well-trained workers. The men in this group range from those who have rela-

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tively little equipment and who may or may not have skill but who do have some luck, to those who are highly skilled, possess serviceable equipment, and do not need to depend on luck to find gold. It is a catholic class, having in common only the fact that its members spend a little but not much time at mining.

Gold Recovery²

When the recoveries of the casual miners, as reported per calendar week, are compared with those of all miners, it appears that a smaller proportion of the casual miners than of all miners recover gold worth \$3.50 or less per week and a larger proportion find gold worth over \$10.50 per week. This appears to be due in part to the fact (mentioned in chapter I and in appendix D) that there is less lost time included in the elapsed time reported spent at the creeks by casual miners than in the elapsed time reported by any other group; and in part it may be due to the fact that many of the men who are at the creeks only a few days work very hard during that brief interval. They may work 9 to 10 hours, or even more, 6 or 7 days a week (see table B-10) and consequently recover more than their neighbors who work on an average of 7 hours per day, 5 days per week (see chapter VI). When the figures for the casual miners and for all miners are recalculated on a standard workweek basis, it appears that a larger proportion of the casual miners than of all miners recover less than \$3.50 in gold in this standard workweek. In other words, many of the casual miners more than compensate for their lack of skill and training by the long hours they put in and so earn more per calendar week than their better trained but less hard working neighbors (see tables 1 and 2).

The relatively high proportion recovering \$3.50 or less per week on a standard workweek basis is what would be expected in view of the general lack of training and equipment among these casual miners. The relatively high proportion shown by tables 1 and 2 as recovering over \$10.50 in gold is due in part to the presence of "snipers"³ who live in nearby towns and villages and who take advantage of the most favorable conditions to mine. They know how and where to find the best bars - for instance, a few virgin bars high up in the mountains which can be worked only for the short time that melting snow provides the necessary water, or a few rich bars that are available only when the water level is very

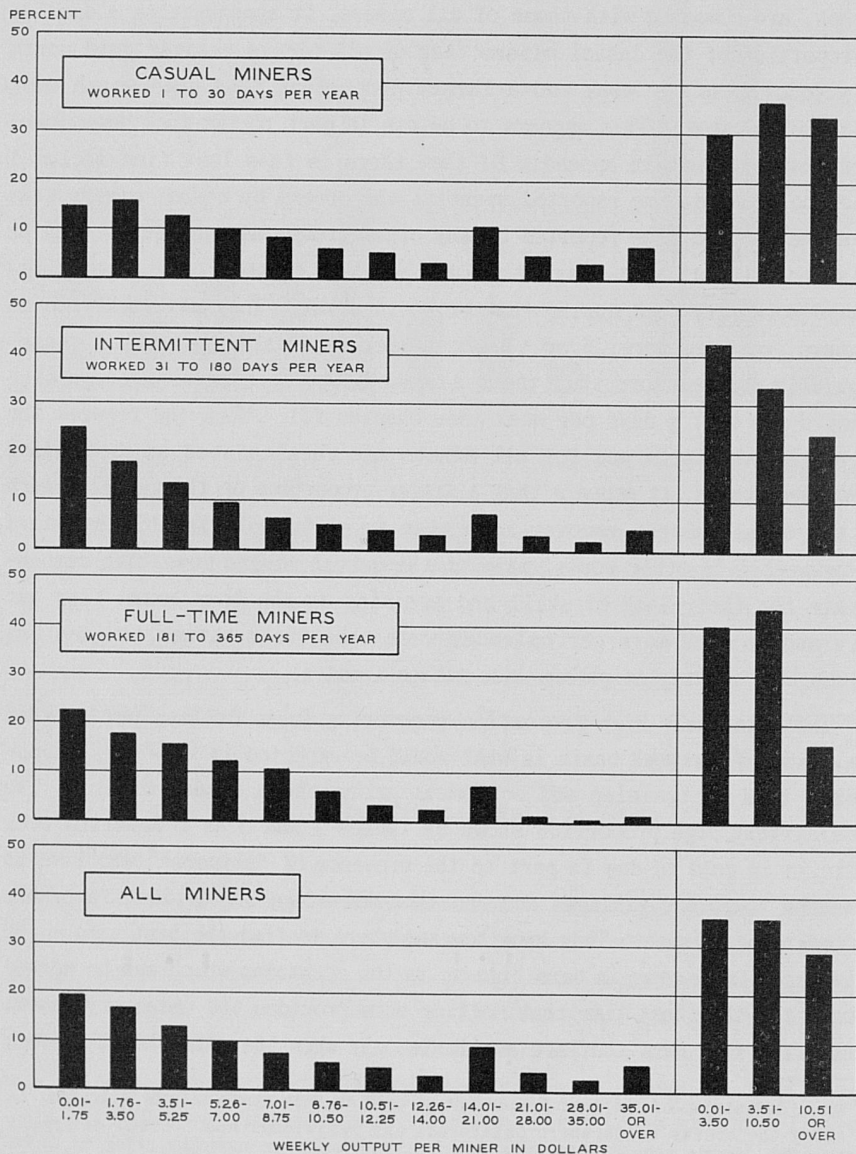
²For a definition of the word "recovery" as used in this study see ch. III, ftn. 1.

³Along the creeks of northern California any individual who, though generally employed, spends some of his idle time on the creeks is commonly referred to as a "sniper." The meaning of this term varies from locality to locality, but for the sake of convenience in presentation this meaning will be adhered to in this report.

low; and while the possibilities in such bars may be exhausted in a few days each spring or summer, the bars pay well while they last.

The significance of the earnings-distribution figures for the casual miners is reduced by the fact that they represent the earnings of only

Figure 10.- PERCENTAGE DISTRIBUTION OF SMALL-SCALE PLACER MINERS IN CALIFORNIA, BY TYPE OF MINER AND ACTUAL WEEKLY EARNINGS, 1935-37



BASED ON TABLE B-9
MERRILL AND NEWCOMB
U. S. BUREAU OF MINES

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those casual miners who do find gold (the earnings distribution would be sharply changed if the recovery of all casual miners who tried their luck at the creeks but failed completely were included), and by the fact that earnings of casual workers (some of whom work very hard, while others work leisurely) are not necessarily representative of those possible earnings of average full-time miners. The main significance of the earnings figures lies in the fact that they are not high enough to encourage many who do attempt placering to stick to it.

INTERMITTENT MINERS

Description

The second group in point of numbers among those finding gold consists of those miners whom we may call intermittent workers - men to whom mining is more important than it is to the casual workers but who do not spend the major portion of their time at the creeks. There is more homogeneity in this group than among the casual miners in that fewer of them put in time merely for the fun of it. A larger proportion in this group are skilled; they have better equipment than is to be found among the casual miners; and, as will be described in the section on full-time miners, in general they work to better purpose than do many of the full-time miners.

Aside from the absence of men who hunt gold as a lark, there is no sharp gradation between the casual and the intermittent miners. Most of the intermittent operators work less than 2 months, and less than a quarter (21.8 percent) work over 3 months (see table B-7). They are short-time operators, but they work, on the average, about four times as long as the casual workers, mining from a few days to over 5 months longer than miners classified as casual.

The intermittent miners fall into three groups: (1) Casual laborers, men who form a reservoir for farm and other types of work during the summer; (2) snipers, men who live near the auriferous streams and make a practice of placering when the shop in which they work is closed or when work at which they are generally employed is not available; and (3) crop miners and other men who make a practice of coming to the creeks at only the more favorable times. There are other miscellaneous types, but most of the men fit into one of these three classifications.

The intermittent miners rely on the auriferous streams only to supplement their income from other sources. If no farm work is available for the moment; if the shop is shut down for the week; or if the regular source of income is closed for the time being, these men need not exhaust their savings, apply to charity agencies, or go hungry. They can


turn to their placering tools, select a bar that experience has taught them will reward their efforts, and assure themselves of at least some sort of income until their regular work is again available.

Such a group of men will, of course, include different types of workers. Men with greater than average initiative may turn to work on the creeks when other employment is temporarily lacking, while other men might merely wait or apply for aid. On the other hand, some industrial workers who are out of employment find the unsupervised work on the creeks more congenial than work at regular hours and under discipline in the towns and cities; they placer even when jobs are available.

Gold Recovery

The recovery figures for the intermittent miners by calendar weeks show a very high proportion with an output under \$3.51 per week, a higher proportion even than was found for the casual miners, despite better equipment and training. This is due in large part, as described in chapter I, to the nature of the reporting of such part-time work. After allowance has been made for the effect of the reporting method and recoveries are recalculated on a standard workweek basis, they are seen to be a little higher for the intermittent miners than for the casual miners. Of particular note is the fact that on a workweek basis the proportion in the group recovering from \$3.51 to \$10.50 in gold is higher for the intermittent than for the casual miners; on a calendar-week basis it is lower (see table 1). The median of the upper 24 percent of the intermittent miners appears to be a bit lower than that of the top group of casual miners; but these high recoveries are made in part, as in the case of casual miners, by men who spend but a relatively short time on rich bars or by men who have access to better than average bars through special arrangements which they are able to make (see tables 1 and 2).

As stated in the explanation of table 2, a large proportion of the intermittent miners are men who mine when they are not employed in the towns or on farms. Those among them who earn over \$10.50 per calendar week usually work steadily while they are at the creeks, but some of those who earn less per week make the lower earnings, in part, because they spend a proportion of their time at work other than mining. They do not rely solely upon their earnings from mining; and, since their outside employment usually pays them better than placering, their total income may be considerably above their reported recoveries on a calendar-week basis. As a matter of fact, the total income of those among the intermittent miners who placer only a part of the time may exceed the



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FIGURE 11.— A GOOD DAY'S WORK

The button in the frying pan is amalgam containing the gold recovery from a good day's work. The miner estimated that the button was worth \$2.80.

income of those who work steadily because they earn more when they do outside work than do many who stay at the creeks. For this particular group of miners, calendar-week recoveries are misleading and understate the amount of money available weekly for living expenses. The figures are useful principally for comparison with workweek recoveries to suggest the proportion of the time intermittent miners placer as compared with other miners. The discussion of recoveries by intermittent miners therefore will be based entirely upon workweek figures.

It will be noted that 25 percent of these miners are listed as recovering under \$3.51 on a workweek basis - a somewhat smaller proportion

than was reported for the casual miners but still a larger proportion than might have been anticipated. The size of this group is due in large part to lack of skill and equipment. The survey figures suggest, but the time data are not accurate enough to prove, that the proportion of intermittent miners earning under \$3.51 drops with the length of time spent at the creeks. This is what would be expected. Some who would like to remain in placer mining because jobs are not available elsewhere, or because they do not like the jobs that are available, or for other reasons try seriously to make a success of placering, but after working for over a month they convince themselves that they cannot earn even \$3.50 per week and they leave. They may have stayed just long enough to be included with the intermittent miners and to increase the number in this class who earn \$3.50 or less per week. Still others who placer between jobs put in over 1 month in all at various times during the year but do not become expert and average less than \$3.51 per week.

By far the largest percentage (51 percent) is in the \$3.51-\$10.50-per-week group, the median recovery being \$6.02. This is a higher proportion than was found for the corresponding group of casual miners, because most of those who do achieve some success in mining and who stay for some months have better than average skill, equipment, and placer ground. The percentage recovering over \$10.50 in gold does not differ much from that found among the casual miners. The median for all the intermittent miners on a workweek basis is estimated to be about \$5.95, or 31 percent above the median for the income on a calendar-week basis. The difference between the two medians is the result of the drop in the proportion estimated to be earning under \$3.50 and the increase in the proportion estimated to be earning \$7.50 to \$10.50 in a workweek as compared with a calendar week (see tables 1 and 2).

It should be borne in mind that these are recoveries procured for a period of not more than 6 months out of the year. Although 51 percent of the intermittent miners can recover \$3.50 to \$10.50 per workweek, with median returns of \$5.95, the assumption cannot be made that full-time miners can make equally good recoveries month in and month out.

FULL-TIME MINERS

Description

Not over 3.2 percent of the small-scale placer miners of California spent over 6 months annually at the creeks in recent years.⁴ The proportion spending this time in the continental United States is probably

⁴See table B-7 and ch. I, fn. 12.

even smaller actively working as they are fewer than over 6 months fewer than spent over 550 men who more than only 8 months of their time

Full-time They include others who as self-employed young and men its response low expenses placering; returns when incompetent time miners recoveries, tion of the more than than that, group of shareholders but steady qualify as old for other stay because are making

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even smaller, since the weather and water conditions in most States with actively worked placer deposits are not so conducive to year-round working as they are in California. It would appear reasonable to state that fewer than 550 men (3 percent of the total selling gold in 1937) spent over 6 months of the year at small-scale placer mining in 1937 and that fewer than 400 (3.2 percent of the total selling gold in California) spent over 6 months at placering in California. Only a fourth of the 550 men who spent over 6 months at this work in the United States spent more than 9 months of the year at the creeks, and the median time was only 8 months. Even the few full-time miners spent a large proportion of their time away from the creeks.

Full-time miners resemble the casual miners in their heterogeneity. They include a high proportion of pensioners, elderly men, cripples, and others who would be submarginal in industry but who can earn something as self-employed miners. Included among the full-time miners also are young and middle-aged men and a few women who do not like urban life and its responsibilities but prefer self-employment with low returns and low expenses. Some who do not like urban living are very skillful at placering; they have learned their business well and can secure good returns when they work. Others were incompetent in the cities and are incompetent at the creeks. Finally, there are to be found a few full-time miners who are both skillful and steady workers; they secure good recoveries, but their numbers are extremely small. Only a small proportion of them are earning good incomes; the rest find it impossible to do more than earn enough to live or, if they find it possible to do more than that, do not think it necessary and are content with less. A small group of skilled, hard-working miners may save enough to become owners or lessees of their own claims and thus be relatively sure of a small but steady income. Most miners who stay at the creeks long enough to qualify as full-time miners remain because they are helpless, or too old for other employment, or physically or otherwise handicapped; a few stay because they enjoy the hermit life, and a very few because they are making a relative success of the work.

Gold Recovery

The most noticeable feature of the recoveries on a calendar-week basis is the large proportion that fall under \$3.51 per week. This is due principally to the presence of pensioners and other submarginal workers and, to a smaller extent, to men who are employed part time at other occupations, such as helping farmers during the summer or working at odd jobs throughout the year. The interviews revealed that about 25

percent of the full-time miners have outside incomes and work at placering but a few hours per week, and that others who have no outside incomes are physically handicapped and are unable to work 5 full days a week. If allowance is made for the leisurely work and the short day put in by this large group of workers, as well as for other part-time placering done during time reported as spent at the creeks (in other words, if the calendar-week recoveries are translated into recoveries on a full workweek basis to make them comparable with workweek output of the other types of miners), the proportion of miners in the \$3.50-per-week-or-less class becomes 15 percent rather than the 40 percent shown in table 1 for all full-time miners. It should be remembered in this connection that since the 25 percent who have outside incomes do not need to rely entirely upon their income from mining, the calendar-week figures are misleading.

There is a great preponderance of men with an output of \$3.51 to \$10.50 per week. Even on a calendar-week basis, nearly half of the men are in that group, and on a calculated full workweek basis it is estimated that 70 percent come within these limits. As the time spent on the creeks increases, the proportion recovering less than \$3.51 and over \$10.50 drops. The proportion of miners with low recoveries declines; concurrently the proportion of the working period that can be spent under particularly favorable conditions becomes smaller and smaller, and with it the proportion of the men who make relatively high earnings. The full-time miners must depend principally on relatively steady work, week in and week out. If they cannot depend on that, they cannot survive as full-time miners unless they have pensions or other outside incomes. Tables 1 and 2 show that the proportion of men with the lowest output is much smaller among the full-time miners, with no outside income such as pensions, than it is in the other groups of miners; the proportion recovering from \$3.50 to \$10.50 per week is much higher in this group than in either of the other two.

The workweek figures for the full-time workers with an output of over \$3.50 per week are particularly significant and would seem to imply that steady work by the more skilled, better-trained, stronger, and more willing miners cannot be expected to result in the recovery of much over \$6.93 per week even when the occasional high returns obtained under specially favorable but short-lived conditions are included.⁵ This is

⁵It will be noted that the median recoveries of those making over \$3.50, when computed on a calendar-week basis, came to \$7.49, or about 58 cents more than when computed on a workweek basis. This is due to the fact that 85 percent of the full-time miners are estimated to earn over \$3.50 per workweek as compared with only 60 percent when earnings are computed on a calendar-week basis. A larger proportion of the 25 percent which moved from under \$3.50 to over \$3.50 when [Con.]

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a significant figure and will be used later in estimating the earning possibilities on an annual basis of trained, strong, hard-working, well-equipped, full-time miners as distinguished from median earnings of all full-time miners.

NET AND GROSS OUTPUT

Commissions

What has been termed "recoveries" or "output" in this chapter represents the gross value of the gold contained in nuggets, dust, and sponge⁶ sold by miners to bullion buyers; but there is a big difference between the value of the gold recovered and the net earnings of miners. In the first place, most miners receive less than 90 percent of the value of the gold they sell, for nearly all of them have to deal with brokers. Treasury regulations require that at least 2 ounces of fine gold (worth \$70) must be included in each offering to the Mint, but the average value of gold offered for sale to bullion buyers was only \$21 per sale in 1935 (0.60 ounce), \$22.45 in 1936 (0.64 ounce), and \$16.46 in 1937 (0.47 ounce). If the miners had sold the gold directly to the Treasury instead of dealing with bullion buyers, they would have had to accumulate three to four times as much gold before making a sale. In addition, they would have had to wait a week or more for the gold to be analyzed and office procedures to be completed before they could receive payment. The men do not have the capital necessary to enable them to make their transactions in this fashion, and so they cannot get along without the bullion buyers⁷ who handle the gold for them at a relatively low charge.

The bullion buyers to whom the placer miners sell their gold (there are nearly 200 in California alone) are usually storekeepers located not more than a few miles from the creeks. Gold buying is a side line to them and is carried on primarily as a means of enabling and encouraging the miners to make their purchases at the stores that take their

⁵[Con.] the computation was made on a workweek basis went into the \$3.51-\$7.00 classification than into the \$7.01-\$10.50 classification, and so reduced the median of this group. The median for all full-time miners, however, was only \$4.69 on a calendar-week basis as compared with \$8.23 for those putting in a full workweek.

⁶"Sponge" is the term given to gold-bearing material that has been treated with mercury and the resulting amalgam heated to drive off the mercury (see appendix A).

⁷These brokers are all licensed by the Federal Government, and in the State of California they must also have a license from the State. It may be of some interest to mention in passing that these brokers report the steady miners to be a very honest group. It would be very easy for men working on streams whose gold is impure to take it to bullion buyers near streams yielding relatively pure gold and therefore to get a higher price for the gold than the dust warrants. Thieves, posing as small-scale miners, occasionally misrepresent the source of the gold, leading buyers to believe it came from placer grounds which yield gold of high fineness, when in reality it is gold concentrate of low fineness, and the price that bullion buyers pay may allow a margin for the possibility of misrepresentation.

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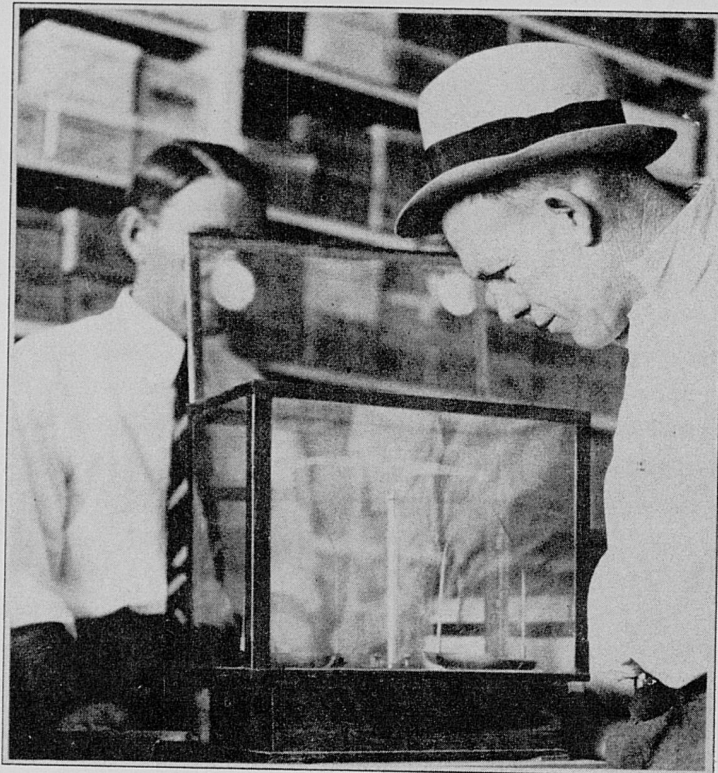


FIGURE 12.— THE BULLION BUYER IS PAYMASTER TO THE SMALL-SCALE PLACER MINER
 Bullion buyers perform an important economic function in the small-scale gold-mining industry. They are usually storekeepers who, operating in the vicinity of the creeks, buy gold as a side line to their merchandise business. A general store of the type at which gold is bought is shown in the lower view; the upper view shows the sale of a small quantity in process.

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gold. The commission of something over 10 percent which they charge will ordinarily meet the cost of transportation and insurance and the Mint charges involved when impure gold is sold to the Treasury but will yield only a small profit. Some buyers make a differential in price for payment taken in trade rather than in cash. They may pay \$27 in cash per crude ounce or \$28 in trade, for instance, as a further inducement for the miners to trade at their stores. A few make no attempt to secure any profit from the deals, believing that they are repaid for their efforts by the good will they receive for buying the gold from the miners.

A gross recovery of \$5.60 per calendar week (the median figure for all miners) would therefore mean that a miner recovering gold worth this amount would actually get only about \$5 for his week's work from a bullion buyer after the 10- to 15-percent commission had been paid.

Automobiles

Another expense which most of the full-time operators, at least, must meet and which must be subtracted from their gross earnings is the cost of operating their cars, which they use to bring supplies to the streams and to take the gold to bullion buyers. The principal items of expense are licenses, gasoline, oil, and tires; repair bills are low since the men do most of their own repair work.

Pumps

A third cost many miners have to meet covers the maintenance and operation of the engines that drive their centrifugal pumps. Over a third of the miners interviewed who gave information on this point (68 out of 182) used gasoline power of some kind in their mining. This would appear to mean that approximately a third of the men who are operating placer mines on a permanent basis use power and must accordingly spend money to buy and to keep motors and pumps in condition and to purchase fuel. None of the miners were able to recover the gasoline tax paid, even though the gasoline was not used to operate vehicles on the public highway. Most of the pumps were driven by small, air-cooled, high-speed engines which use about a gallon of gasoline per day.

Miscellaneous

There are several miscellaneous expenses which must be met by some of or all of the miners. A few pay royalties. Since those who do, however, usually mine beds of more than average richness, their returns after payment of royalties are at least as great as the average returns



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FIGURE 13.— A LIGHTWEIGHT ENGINE-AND-PUMP OUTFIT

From one-fourth to one-third of the miners who mine more or less permanently use small gasoline engines to increase the amount of gravel they can wash in a given time period. Usually the power is applied to pump water to a long tom (called a pump tom in this instance) into which the gravel is delivered by hand. Such engine-and-pump units must be light in weight as an aid to easy transportation.

of men who work poorer beds that require no royalties. A few miners are operating equipment of considerably more than average cost, such as dredges, scrapers, hoists, and drift-mine equipment. In most instances, however, the returns after meeting the extra expenses involved in operating these pieces of equipment are more than the average for

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miners without such advantages. All miners must procure such tools as picks, shovels, pans, and simple carpentering tools, and keep them in usable condition. A miner in the upper-income groups (the groups recovering over \$3.50 in gold per week) who has the median recovery of \$9.52 per week will receive less than \$8.50 per week in cash from the bullion buyers, and after meeting the costs of transporting the gold, costs of operating gasoline engines and pumps, and other miscellaneous expenses such as those connected with tools, he will have a net income that may approximate \$8.00 per week. A full-time miner in the upper groups who has the median recovery of \$7.49 per week will actually have only about \$6.00 in cash left after paying the commission to the bullion buyer and his other incidental costs. The median recovery for all full-time miners is \$4.69; by the time their costs are defrayed, less than \$4.00 per week is left for living expenses.⁸

Tables 3 and 4 give the distribution of estimated net earnings available for living expenses after the costs incidental to small-scale placer mining have been met.

Table 3.- DISTRIBUTION OF NET OUTPUT, BY ACTUAL WEEKLY EARNINGS AND TYPE OF MINER, 1935-37^a

Earnings	All		Casual		Intermittent		Full-time	
	Percent of total	Median	Percent of total	Median	Percent of total	Median	Percent of total	Median
\$0.01-\$3.50	36	\$1.75	30	\$1.95	42	\$1.75	40	\$1.50
3.51-10.50	35	5.25	37	5.40	34	5.05	44	5.30
10.51 or over	29	16.55	33	16.75	24	16.05	16	13.75
3.51 or over	64	8.05	70	8.60	58	7.40	60	6.10
Total	100	4.70	100	5.65	100	3.70	100	3.85

^aEarnings groups represent gross output; medians represent net output. For estimated costs, compare with table 1.

Table 4.- DISTRIBUTION OF NET OUTPUT, BY ESTIMATED FULL-TIME WEEKLY EARNINGS AND TYPE OF MINER, 1935-37^a

Earnings	All		Casual		Intermittent		Full-time	
	Percent of total	Median	Percent of total	Median	Percent of total	Median	Percent of total	Median
\$0.01-\$3.50	30	\$1.45	35	\$1.70	25	\$1.45	15	\$1.70
3.51-10.50	43	5.25	35	5.40	51	5.00	70	5.25
10.51 or over	27	16.55	30	16.90	24	16.10	15	13.80
3.51 or over	70	7.25	65	8.30	75	6.30	85	5.60
Total	100	5.10	100	5.00	100	5.05	100	5.15

^aEarnings groups represent gross output; medians represent net output. For estimated costs, compare with table 2.

Footnote 8 appears on following page.

ERRATIC INCOMES

An income of \$6.00 per week (the estimated, approximate calendar-week net for the median full-time miner in the group recovering over \$3.50 per week) might not be so bad if it were steady. Unfortunately, creek bars are being depleted, and one that may yield well today may yield nothing after the next storm, or it might possibly yield even better than ever for a while. It is a gamble. A miner who has an income of \$2 per day one week may find next week that his income is 75 cents per day. The following week he may find his income is 25 cents if he works steadily, and he may accordingly pack up his simple equipment and move; he will keep moving until he decides that he has found the best bar his resources will permit. This bar, too, may yield satisfactorily for a while and then suddenly fail. The result is that most miners have very erratic incomes. A steady income of \$6 a week would be one thing; an exceedingly erratic income which averages \$6 per week is much less satisfactory.⁸

REASON FOR LOW EARNINGS - HAND WORKING OF POOR GRAVELS

The reason for such unsatisfactory incomes may possibly be better understood when it is recalled that small-scale placer mining by hand methods is an attempt to extract a living from a parsimonious Nature by human muscle, with very little aid from tools. The only energy provided by other than human exertion is a little free water power and power drawn upon by about a third of the full-time miners who utilize gasoline engines to pump water. But even these miners, more fortunate than the rest, shovel gravel themselves.

Wherever human muscle, unaided by power equipment, works against nature, it is an almost universal result that returns are very low unless the work requires great skill. This holds true for placer mining. If bars are exceedingly rich, as many of them were for a time in the late

⁸It should be borne in mind that while these figures are derived from reports of bullion buyers and from first-hand investigations, they do not necessarily represent the actual experience of any particular miner. They may be a little higher or lower than the earnings or expenses of any particular miner, but they are representative of the experience of the classes of miners discussed. One qualification should possibly be made to this. Costs have been figured on a weekly basis, but they may not be evenly distributed. An engine, for instance, must be bought at one time (though it may be paid for on a weekly basis). If it must be repaired, the cost must be met at one time. Expenses may come in groups rather than be spread out as has been done here. And, as is shown later, income may also be irregular.

⁹The erratic nature of the income derived from the same mining areas may be illustrated by reference to the average output per man-week from a few creeks. Dry Creek in Amador County, Calif., gave a recovery of \$26.02 per man-week in 1936 and \$6.37 per man-week in 1937; Consumnes Creek in the same county, \$6.00 per man-week in 1936 and \$4.15 in 1937. Pine Grove Creek in the same county gave a recovery of \$64.15 in 1936 and \$12.51 in 1937. Week-by-week recoveries were even more erratic.

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1840's and 1850's, muscle power may extract returns, for a time, comparable with those won by skilled labor in urban centers. But when the bars are small, lean, and uncertain in their distribution and erratic in their content, as they are in most known auriferous areas available to small-scale miners in the United States today, hand labor expended on them generally cannot yield earnings comparable with wages.

Mechanized mining can still yield good returns in many areas, even on beds with a lower gold content per yard than those being worked by hand, because the gold content is certain, the yardage is extensive, and the amount handled per man-day with the aid of power machinery is many times the yardage one man can handle unaided by machinery. But even when beds are worked by power, they must be extensive and must give a constant yield to be profitable. If they yielded well one day, little the next, and nothing the third, as do many bars worked by hand, they could not be made to pay no matter how much machinery each man could put to work.

CHAPTER V

SOME PERSONAL CHARACTERISTICS OF THE FULL-TIME MINERS

The full-time miners in California are mostly Californians; indeed, 194 out of 204 miners (mostly full-time) who answered the question regarding their residence claimed that they were citizens of California. This is an extremely high proportion for such a low-income group of workers in the State, and it is probable that many of them were claiming State citizenship in order to be able to secure the benefits available to citizens only, in the form of relief and of old-age pensions. There is a fair representation of immigrants from other States, but almost any group of people living in California will contain a considerable proportion of immigrants.

Three-fourths of the men interviewed in 1935-37 appeared to be citizens of long standing, as 147 out of 192 who gave information on the point said they had been living in California as far back as 1930. Of the 45 who had come to California since 1930, 21 said they had come to mine gold, but the rest came for a wide assortment of reasons. Health was given as the cause of migration by six, climate by four, and miscellaneous reasons by the others. Most of the men who had come to the creeks from a distance because of the publicity had apparently left by 1937.

Corroborative evidence that most of the men interviewed had been in the West and probably in California for several years is offered by their answers to the question concerning the length of their experience with placer mining. Seventy-nine out of 174 answering the question said that they had done this sort of work before 1932; 56, that they had done it before 1929; while 13 said that they had recovered gold by independent placering before the turn of the century. One miner had followed placering intermittently since 1875.

MANY MALADJUSTED MEN

One of the most noticeable features of the full-time miners particularly, and to some extent of the casual miners, is the large proportion of maladjusted men - those who could not get along with employers, who had difficulties with relief officials, or who could not adapt themselves to regular working hours. Placer mining will, of course, tend to accentuate individual qualities, but it will also tend to sort out men who are somewhat unsocial or at least unadjusted. Miners who stay

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at the creeks represent the survival of the most successful and the luckiest men, as well as the most unfit; they form a somewhat unusual agglomeration of personality types.

PLANLESS WORKERS

Most of even the full-time miners operate in a given area only, and during a relatively short season. Since some streams can be mined to best advantage only during definite seasons, the miner's stay at a particular stream may be limited to 3 or 6 months out of the year. It is strange that, despite the fact that the seasons in the various watersheds are complementary, probably less than twoscore miners make a year-round circuit from one watershed to another.

If full-time miners had the initiative, it would not be difficult for more of them to find the watersheds whose seasons are complementary.¹ Casual miners would not be expected to do this, and intermittent miners may be attached to a particular area because they have families or work for wages; but many of the full-time miners, except the aged and infirm, could work out an itinerary that would enable them to work the creeks practically 12 months of the year. Instead, they live a planless, day-to-day life. If the bar they are working gives out, they move to another bar on the same creek or on a nearby creek and more often than not to another bar in the same county.² When the season in that area is over, they seek a living at odd jobs or go on relief. They have had initiative enough to learn a good deal about placer mining but not enough to follow the trade persistently.³

The character of the miners is further illustrated by the disposal of the "Soldiers' bonus" by miners who were World War veterans. Although

¹See table B-3. The number of man-days spent at the creeks in California in the slackest month of 1935 (June) was 77 percent of the number in the busiest month (March). When men on one watershed were not working because conditions were not right, men on another watershed were working; June was a low month, not because conditions were unsuitable, but because the farmers needed men.

²The lack of mobility of the full-time miners is illustrated by the following data showing the average length of stay on each creek and in each county, compared with the total number of days spent at the creeks, for a selected group of miners. Not all were full-time miners, but their habits are illustrative of those of full-time miners.

Year	Average number of days -		
	Total	Per creek	Per county
1935	90	84	90
1936	103	89	94
1937	102	75	95

³There is another side to this. Some miners have built or have acquired cabins which they do not wish to take the chance of losing. Others have found cheap sources of food, such as cull farm products, which they do not wish to lose. Friendships deter others from moving to the next likely stream when the season is over where they are. The adjustment to placer mining 12 months of the year is not easily made, particularly by men with families.

a large number in this group needed additional equipment to successfully carry on operations, the interviews revealed that the greater portion of the "bonus" money was spent within a few days and largely for pleasure. Checks for amounts equal to 2 or 3 years' earnings were gone in almost as many weeks. Only a few of the men bought equipment with the money; the rest preferred to have a good time while it lasted and then returned to living on \$6 per week when the creeks would yield that much.

The same story is usually repeated on a small scale when one of the men finds a nugget or a small, rich bar. Work is stopped until the money is gone. And, as most of the men are open-handed, work may be suspended up and down the creek and all the men join in the good time.

There are many notable exceptions to this general planlessness. A third of the full-time miners have managed to acquire small power outfits, and that is a sizable proportion to succeed in disciplining themselves enough to save \$50 to \$100 out of their earnings. It is a particularly large proportion when it is realized that the men who are attracted by life on the creeks are the type who enjoy the absence of supervision, men who easily slip into a life of day-to-day existence. The wonder is not that so many threw away their bonus money, or that they spend unwisely when they find a nugget, but rather that a third of the men saved enough to buy equipment and that a few worked out an itinerary that gives 12 months' employment.

The difference in earnings and living standards between those who plan ahead and those who give little thought to the future emphasizes the fact that while the absence of any requirement for an employer opens the field to all, the presence of the equivalent of an employer to train, equip, and direct the men would make a great difference in their earnings. The men cannot support themselves long enough while learning to master all the tricks; so most of them learn only the rudiments. They do not know how to take advantage of the best water conditions in each available watershed; so they work under disadvantageous conditions where they are. Since they are not able to save, they do not secure the best equipment. Men who dislike supervision take to the work, whereas men who are used to discipline are most successful at it.

AGE

Another noticeable feature of the full-time miners is their age. Forty-nine percent of the miners interviewed (largely full-time miners) were over 50, and 76 percent were over 40 at the time of the interview. This

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is an unusual age distribution but an expected one in view of the large proportion of men who came to the creeks because they were submarginal in industry. Many of these older men were found to be working just as hard as the younger ones. The long tom, the sluice, and the pan refuse to discriminate against them because of their age and give them just as much gold per yard of gravel as they do the younger miners; so the older men feel they have found a vocation in which they are not disqualified

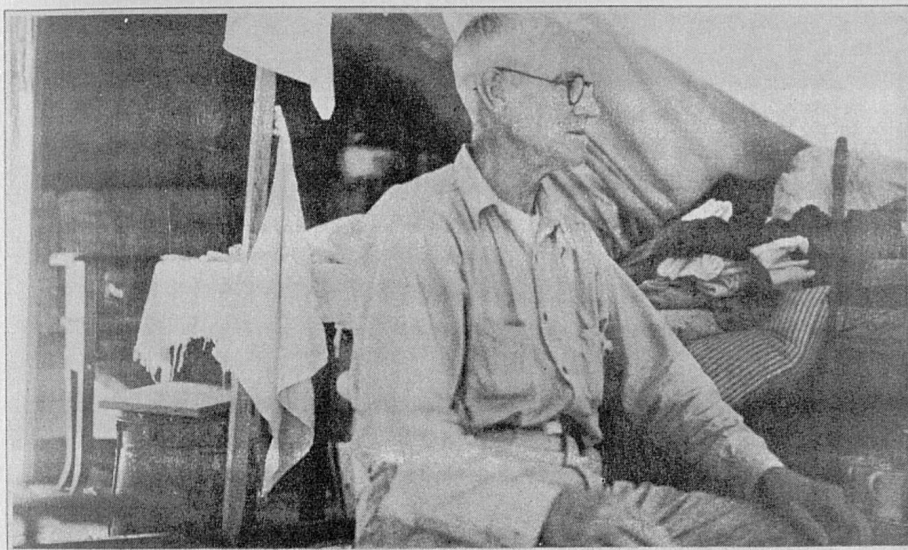


FIGURE 14.— ABOUT ONE-HALF OF THE MEN PLACERING REGULARLY ARE OVER 50 YEARS OLD

Age does not disqualify men for placering, and many older men turn to this work when they can no longer find employment in industry. They adjust their pace to their capacity for work. Although some take regular and frequent rest periods, others work long hours at relatively hard labor.

by their age. It is interesting to note that interviewers were frequently told by miners in their forties and fifties that it was impossible for them to find work in their trades again as they were considered too old.

No satisfactory information was obtained as to what happens to the men when they grow too old to work. They leave the creeks, but how or for what destination was not discovered. Information was secured concerning only two deaths on the creeks, and these were due to violence.

The age distribution for the intermittent miners would probably be about the same as for general industrial workers, while the distribution for the casual miners might be weighted with younger men. No data on these groups are available.

MINERS UNFIT IN INDUSTRY

Some of the miners interviewed had been rendered unfit for industrial pursuits by injuries or sickness rather than by age. One man was found with only one good arm and hand; another was going blind. Others were obviously sick from wasting diseases, such as tuberculosis. Such men were unable to find employment in industry but were able to obtain some income through their own efforts at the creeks. Small-scale placer mining appears to have been helpful to many of them by giving them work and an income, though in a few instances men who obviously should not have been working were found mining for gold.

LACK OF DEPENDENTS

Most of the workers interviewed were single men without dependents. Of the 204 (mostly full-time) miners who gave information on this point, 139 had no dependents and 65 had 1 or more. Of the 65 men with dependents 45 had 1; 10 had 2 dependents; 5 had 3; 2 had 4; 2 had 5; and 1 had 8 dependents. In most instances, the dependents reported were wives who helped in the mining, and the husbands said that their wives usually recovered as much gold as they did. These wives were, therefore, not really dependents. A few miners reported dependents who were not living with them on the creeks, but only two or three said they were sending money for the support of these absent relatives, and they were not sending money regularly. As a matter of fact, there were several instances in which relatives were sending money to the miners.

The 3 percent of the miners who stick to the streams 6 or more months of the year are predominantly single men without families to support, but the situation is different among the casual and intermittent miners. Migratory workers, who follow the harvests with their families, oc-



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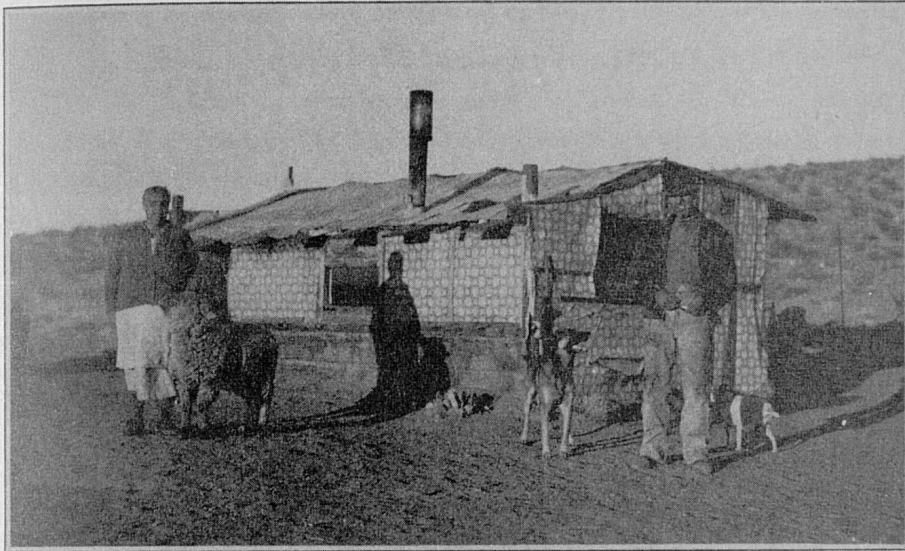


FIGURE 15.— MINERS AND THEIR WIVES

Although most placer miners are without dependents, the wives of some accompany their husbands on the creeks. These women frequently help in mining as well as by performing the usual camp housekeeping duties.

casionally come to the creeks, and families probably are more numerous among the casual miners than among the full-time miners. The proportion of intermittent miners with dependents probably is also much greater, since many of them live in nearby towns and support their families from their earnings received for work performed for wages, supplemented by earnings from the creeks. The full-time miners, however, are in nearly all instances unable to support families, and so it is almost essential that one be single if he proposes to become a full-time miner.

GOOD HEALTH

The health of the workers is one of their few assets. The health of even the older and the crippled men was apparently better than average. Steady outdoor employment under conditions that enabled them to suspend work at will if they felt unwell helped keep the men in good condition. There was little evidence of the use of alcoholic drinks, although some of the men had occasional sprees in town. Local storekeepers in the more remote areas have found it unprofitable to carry distilled liquors (in part because of the high tax for dispensers of such spirits). Only wine and beer are available in such communities, and the opportunity for sprees is accordingly reduced as the distance from the cities increases.

KNOWLEDGE OF USE OF TOOLS

Another asset possessed by many of the men is a knowledge of the use of tools. Of the 201 small-scale (largely full-time) miners who reported that they had worked at trades other than placer mining, 16 stated that they had worked as laborers, 14 as quartz miners, 12 as carpenters, 11 as farmers, 9 as housewives, 7 as general mechanics, 7 as loggers, 6 as blacksmiths, 6 as structural-steel workers, 6 as pipe fitters, 4 as truck drivers, 4 as fruit and vegetable workers, 4 as automobile mechanics, and the rest as machinists, cooks, oil-field workers, painters, or at other crafts. It will be noticed that most of these crafts require some initiative and skill in the use of mechanical equipment. Even those who listed themselves as laborers knew how to use tools. Only three professional men were found. In each of these three cases some training in the use of tools was evident. Although many of the men tended to overrate themselves in naming their trade, and a strict classification based on their records probably would have listed a large proportion as helpers or laborers rather than as mechanics, nevertheless most of the men had received some mechanical training, either formal or informal.

Most of the miners interviewed had had relatively little opportunity to work with tools for wages since 1929. Nearly half (97 out of 202 among those interviewed) were without jobs in 1930, and many of those who still had jobs in 1930 lost them soon after. The desire to use their hands again, as well as the fact that a large proportion were familiar with small-scale placering methods and knew they could make something by working for themselves when they could find no jobs, probably had something to do with the migration of these men to the creeks. On the other hand, lack of training in the use of tools may account in part for the short time spent at the creeks by most men.

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INTERMITTENT MINERS MORE REPRESENTATIVE OF INDUSTRIAL WORKERS

The intermittent miners, those who work the streams at particularly favorable times or between jobs, or who follow a more or less regular schedule which takes them to the harvest fields or the lumber camps in season, come closer to being a cross section of the active workers of the country than either the casual or the full-time miners. A considerable proportion of them are married men with children or men who are living with their families in nearby towns and cities. They come largely from the low-income stratum of the population, but the group includes men of energy and initiative who are not content to sit around and wait until regular work is available. They have at least average and usually better than average health. They have also a better than average knowledge of the use of tools and are able to displace local workers since many of them are more skilled at their trades than are the natives of the auriferous areas.

CHAPTER VI

WHY AND HOW THE MEN ADAPT THEMSELVES TO THEIR WORK AND THEIR LOW INCOME

In view of the character of the work and its low returns, the question naturally arises as to why and how men adapt themselves to this pioneer type of life and its exceedingly low earnings. The adaptation of those who stick to the work is not so difficult as it might appear, for the selective process quickly weeds out those who cannot adjust themselves readily and leaves those to whom the life does not seem strange and to whom it may even seem attractive. Men who cannot live on a steady diet of canned foods, flapjacks, and beans; who cannot repair their own equipment or fix the roof when it leaks; and who dislike solitude cannot long survive the life at the creeks.

Phrasing it differently, the probability that a miner will adapt himself to placer mining may vary directly with his self-sufficiency. If he can live alone, take care of his own needs, work without supervision, and live on a few cents a day, he may become a full-time, small-scale placer miner. Men to whom such a life appeals, or men to whom it is not unattractive, can adapt themselves to placer mining, and some of them thrive physically on it. But the proportion of workers in California, or even in the country, who can meet such qualifications is very small; so the number who can make a success of or even last at placer mining is very limited. Men who can fix the roof if it leaks, or build it from scratch if necessary, can readily be found; but not many men can both fix the roof and stand living alone under it after working alone all day. So the process of adapting themselves to the creeks is primarily one of selection; most of those who try it cannot adapt themselves, and leave.

WHY MINERS ADAPT THEMSELVES TO THE CREEKS

There are two reasons why men have tried to adapt themselves to small-scale placer mining with its very low income. The major reason has been the difficulty of finding a job with a satisfactory income anywhere else. The migration of families from the Dust Bowl helped to create a large excess of labor in California and to keep wages in the fields and orchards low; so that by contrast the returns from mining did not appear so bad to the unemployed, while the housing conditions might actually have appeared better than those which they could secure in the

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harvest areas. The *Census of Manufactures* listed 284,096 as employed by industry in California in 1935; the number was 358,083 in 1937. But the unemployment census taken in November 1937 found 258,111 totally unemployed and wanting work, and another 91,475 WPA, NYA, and other emergency workers. If the coverage in California was the same as that in the country as a whole - that is, 71.4 percent - the number of totally unemployed may have been as high as 360,000. If the coverage was better than 71.4 percent, the number of unemployed was somewhere between 258,000 and 360,000, but in any case it probably was larger than the average number reported as employed in manufacturing industry in 1935, and not far from the average number employed in manufacturing in 1937.

The second reason why men are willing to adapt themselves to the conditions on the creeks, at least for a time, is the independence that goes with small-scale placer mining. After employment on a piece-work basis in harvest fields or orchards, or after working under the discipline of industrial employment, some men find the freedom incident to placer mining a great relief and a compensation for much that might otherwise be considered not worth enduring.

HOW MINERS ADAPT THEMSELVES TO THE WORK

Many of the men approach their work with some originality and skill and have developed very ingenious devices and techniques without supervision. On their own initiative they have built hoists out of automobile transmission equipment and dredges out of scrap lumber and second-hand materials and have constructed other equipment from such material as was available. Left to their own devices, many have risen to the situation and have made the most of their training and the materials at hand. But most of them take life as easy as possible. If they can earn enough in 4 hours to get by, they work 4 hours only; if 8 hours are needed to bring in the minimum income, they work 8 hours. Their work is not governed by time clocks or production schedules.

Finding a Place to Mine

Some idea of the difficulties facing a would-be miner entering gold-bearing terrain may be realized when it is recalled that many of the forty-niners failed on the creeks of California when gold was much more plentiful than it is now, and when it is further recalled that in the nearly 90 years during which gold has been actively mined, all the profitable areas have long since been patented or at least taken up as mining claims, or have been purchased for farming or other nonmineral purposes. Consequently, a miner who has been successful in locating a place that

looks promising will ordinarily find that someone else has established ownership to it a long time before.

About half of the miners interviewed who gave information on this point (102 out of 201 miners) were working without making any effort to secure permission; 63 were working with permission; 24 owned the claims they were working (mostly claims that were so poor that others had passed them by, but that did yield something); 6 paid royalties of 10 to 20 percent; and 2 were supposed to pay royalties above fixed earnings. The rest worked under various sorts of agreements, such as acting as caretaker for property in return for the right to mine. Owners of rich bars, of course, will not freely permit unrestricted mining, but many private owners of low-grade gravel that will not pay wages make no objection to its being mined without royalties provided the operation does not become a nuisance.

The situation is sometimes different when the men attempt to work on the public domain, for it is the duty of Government officials to protect public property, and they have not been enthusiastic over the invasion of public lands by miners. The Forest Service, for instance, has a very useful policy of keeping a strip of land a quarter- to a half-mile wide, on either side of major scenic highways, in its primitive state. Its officials naturally object to the building of hovels within this protected area, though they sympathize with the men and allow them to build a half-mile back from the road. But this means that the miners must maintain their own drives to their shacks, which is a real hardship in muddy weather. The danger of forest fires is ever present, and the Forest Service also must be very careful that careless miners do not become a fire hazard. Game wardens may object to the presence of the small-scale placer miners, who sometimes muddy waters and hunt or fish without regard to game laws. The muddying of water used for irrigation purposes may also create difficulties at times. River pollution is another problem where miners work on streams whose waters are used by towns or cities, and restrictions imposed by sanitary districts sometimes add to the miners' difficulties. One of the first adjustments the miners must make, consequently, is that of accommodating themselves to property rights which deprive them of the chance to work the best bars which already are privately owned, and to laws and regulations which interfere with operations on the poorer bars on the public domain.

Finding Transportation

Once an equipped miner has found a place to mine, the next task is that of arranging transportation. Most of the men take care of their

transportation requirements by using ancient automobiles and trucks rather than pack animals. With very few automobile tools, they manage to keep these old vehicles running, even over hilly roads.

Of the 205 miners interviewed on the ownership of automobiles, 141 either owned an automobile outright or had an interest in one. Cars are not entirely a luxury, as some means of transportation is necessary

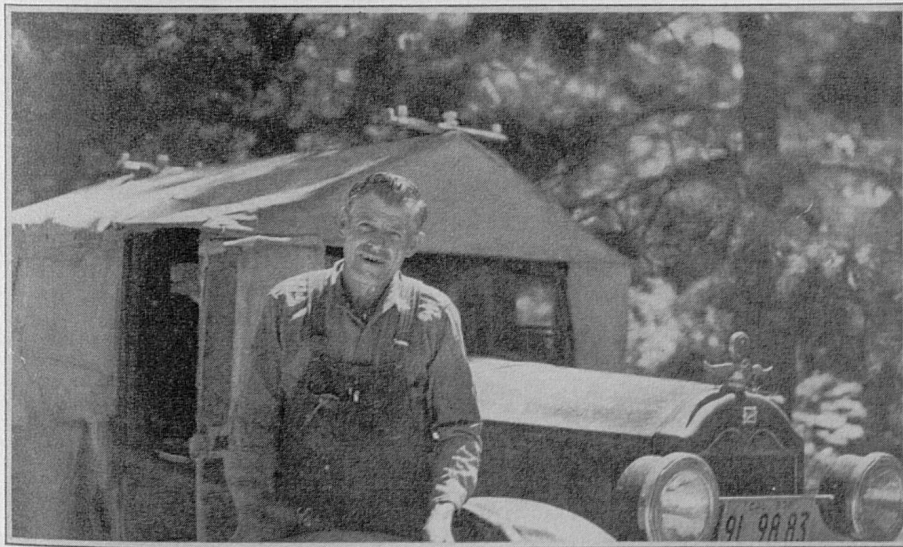
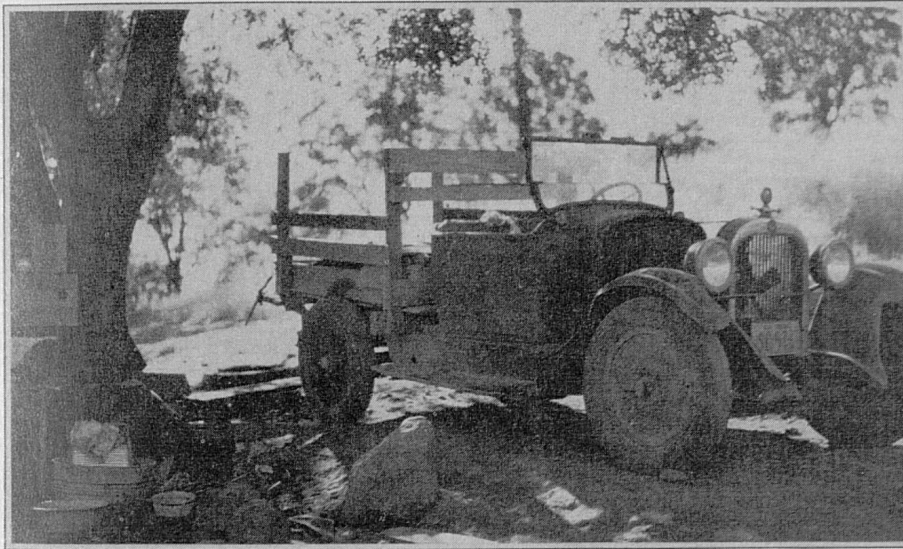


FIGURE 16.— OLD-MODEL AUTOMOBILES HAVE REPLACED THE BURRO AS THE MINER'S SOURCE OF TRANSPORTATION

Work and residence in isolated areas make an old-model automobile as much a part of the standard equipment of a small gold producer as pick, shovel, pan, and long tom. About three-fourths of the miners either own or have an interest in cars with an average age of about 10 years. Sometimes, as illustrated by the lower view, the automobile is also a home that can be moved easily from stream to stream as water and weather conditions change.

both to sell gold and to bring in supplies and to get such odd jobs as may be available; and second-hand automobiles serve better than pack animals for these purposes. Only one man was found who had a pack burro, and he lost much time in going to and from the bullion buyers. Cars also make it possible for skilled miners to move from stream to stream. Some bars can be worked best when water is high and others when the water is low. A car, therefore, enables the skilled miner to change his place of operation in accordance with what appear to him to be the best probabilities, and to go to harvest fields or other jobs in season and later return to mining, at relatively low cost and with little loss of time.

The average age of the automobiles is approximately 10 years. Two cars of 1923 vintage were found in the fall of 1937. Of the 42 on which information was obtained, 13 were Fords; 7, Chevrolets; and the rest, larger-type cars. The major expenses involved in operating these automobiles are for gas, oil, tires, and licenses; maintenance bills are small since most of the repair parts needed are picked up at little cost from junk yards and the men do their own repair work.

Deciding How Long to Work

Most of the full-time miners work relatively few hours a day and few days per week. Pensioners, particularly, work very short hours. Two-thirds of the men interviewed who gave information on the number of hours worked (126 out of 185) reported that they put in 6 to 8 hours each day; 46 reported shorter working hours (see table B-10). These 46 included the old and crippled, who were unable to work long hours, and pensioners and others with outside incomes on whom it was not incumbent to work what might be considered a full day. Thirteen, or about 7 percent of the sample, reported that they worked an average of 9 to 12 hours per day. This is not a bad record for self-employed men of over-average age doing such hard work, since the miners must also gather their own fuel (wood) and do their own housekeeping and cooking. Most of them reported they had to spend more time gathering wood and doing housekeeping and cooking than they had spent in going to and from work in cities, and that a 7-hour day at hard work shoveling gravel is as tiring as an 8-hour day in the city even though there is little time lost in getting to and from the gravel bars. A 7-hour day appears to be the median for all but the submarginal workers, pensioners, and those who are merely trying to get by.

Over 30 percent of the men answering the question on the length of the working week (54 out of 177) reported that they worked an average

of 33 to 40 hours (5 days) per week, averaging 41 to 50 hours to 32 hours, or 5 days, and stream level that can be worked, therefore, do conditions, or 1 week.

HOW THE

The Casual Miner

The casual miner, with little intelligence and readily the lowest wages, most of them are and uncertain usual laborers, cities, prefer for themselves less than \$6 per day by leaving.

The Intermittent

The intermittent miner, at fair wages, source of income provided by place short period, possible relation.

Men With Outside

Men with outside income, in adapting their living may act of some of the Other items (such as or nothing, and cause they mine Thirty-five out

of 33 to 40 hours, and the median of the group was 36 hours (or about 5 days) per week (see table B-11). Twenty-three percent reported working 41 to 50 hours, or 6 to 7 days; and 23 percent reported working 24 to 32 hours, or $3\frac{1}{2}$ to $4\frac{1}{2}$ days weekly. The median for the 177 was 36 hours, or 5 days per week on the basis of 7 hours per day. Bad weather and stream levels will, of course, reduce the number of days per week that can be worked to less than 7. Only 5 days a week spent at work, therefore, does not mean that 2 days of good weather and water conditions, or 1 day in addition to Sunday, are lost on the average each week.

HOW THE MINERS ADAPT THEMSELVES TO THE LOW EARNINGS

The Casual Miner

The casual miners have taken to the work, and many have brought intelligence and skill to its prosecution, but most of them do not accept readily the low income that goes with it. After placering a few weeks, most of them are more than willing to exchange the freedom and the low and uncertain income for jobs at good wages. Even the men who are casual laborers, who go from job to job in the harvest fields or in the cities, prefer working for someone else even at low wages to working for themselves on the creeks for an uncertain income which may average less than \$6 per week, and they make their adjustment to the low income by leaving.

The Intermittent Miner

The intermittent miner is always ready to leave the creeks for a job at fair wages and ordinarily considers the gravels as a supplemental source of income only. He therefore adapts himself to the income provided by placering only when he has no other work, by staying only a short period, or by working only when the most favorable conditions make possible relatively high earnings for a time.

Men With Outside Incomes, Such as Pensioners

Men with outside incomes, such as pensioners, may have less difficulty in adapting themselves to the life on the creeks. Their standard of living may actually rise when they go to the streams because the costs of some of the items that they use are lower there than in the city. Other items (such as rent, fuel, and water) may be obtained for little or nothing, and in addition their income may be somewhat higher because they mine some gold whereas they had earned nothing in the city. Thirty-five out of 170 miners (20 percent of those who gave information

on the point) were receiving some sort of outside income, and 24 of the 35 were receiving pensions. About a fourth of the full-time operators relied on some supplemental source of income in addition to what they made from work (from either wages or placering). This large proportion is representative of the full-time miners only; it is obviously not representative of the 12,422 small-scale placer miners in California in 1937 nor of the 18,000 in the United States who sold gold in that year.

It is interesting to note that many of the miners with outside incomes worked very differently from their fellows of the same age and health who did not have outside incomes. One of the old miners, for instance, was found working 10 hours a day and 7 days a week in 1936; when he was again visited in 1937, he was receiving a small pension and was working only 2 or 3 hours a day. His pension would not have supported him in town, but it enabled him to live leisurely on the streams. For such men, life on the creeks is often relative luxury when compared with the life that would be followed in the cities. But many of the miners with outside incomes were physically handicapped and unable to work steadily; so their low recovery was as much due to their lack of strength as to their relative lack of need.

The Full-Time Miner

Net Income to Which Living Expenses Must Be Adapted.— Using the estimated net workweek earnings as given in table 4 rather than the lower net calendar-week earnings¹ given in table 3, and assuming that not more than 5 weeks' work would be lost each year because of unfavorable weather or water conditions, sickness, or other causes,² it would appear that a full-time miner whose weekly earnings equaled the median for full-time men might have a net income of about \$245 per year. If the earnings of those miners who recover less than \$3.50 per workweek are excluded in calculating the median, it would appear that a miner with the median recovery would have about \$260 per year net, after paying commissions to the bullion buyers and after meeting the other business expenses incidental to placer mining. If, however, we assume that no time at

¹Earnings of full-time miners on a calendar-week basis were reported as much lower than earnings on a workweek basis, in part because of the large number of pensioners and others who did not put in a full workweek each calendar week. This was discussed in ch. IV. In estimating the probable income of competent miners, therefore, it is better to use the workweek rather than the calendar-week figures in order that the earnings of those who do not put in a full workweek will have no effect on the calculations.

²This is an extremely low figure to use. Eight to ten weeks would probably be a closer estimate of the time that would be lost each year owing to conditions beyond a miner's control.

all is lost because of outside work that will cause all earnings lost. This probably is a reasonably lucky, to average for a



FIGURE 17.— HO

Although tents a proportion of the from discarded and the upper view is

all is lost because of sickness and that it is possible to obtain outside work that will bring in enough additional income to compensate for all earnings lost because of bad weather or water conditions or other causes, this figure of \$260 per year might be raised to about \$290. This probably is the highest figure that a competent, well-equipped, and reasonably lucky, full-time, small-scale placer miner might be expected to average for a year's work. It may seem to be a low estimate, but

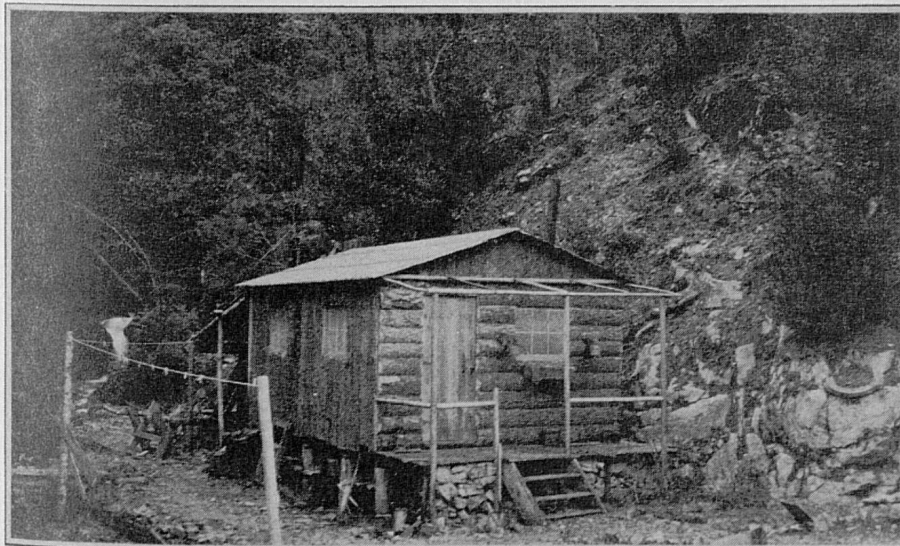
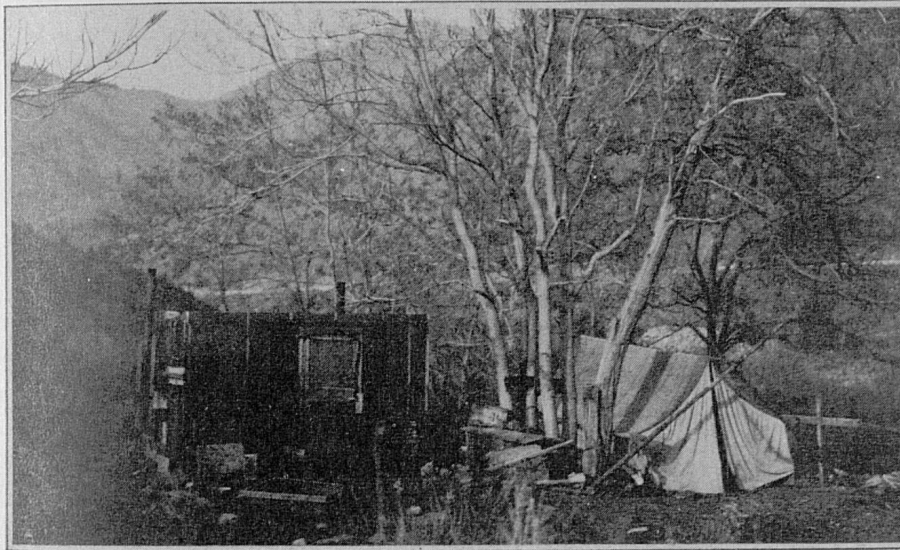


FIGURE 17.— HOUSING AT PRACTICALLY NO EXPENSE IS PART OF THE INCOME OF PLACER MINERS

Although tents are commonly used for shelter along the creeks, a large proportion of the miners live in shacks or cabins which they have built from discarded and available materials. A representative miner's shack in the upper view is compared with the better-than-average cabin shown below.

when it is compared with the median annual output of about \$20 for all miners and of less than \$150 for all full-time miners during 1935-37, the figure of \$290 is seen to be a liberal estimate of the possible annual income for a well-equipped full-time miner.

Shelter.- Full-time miners - with the exception of a very few who are lucky or successful and of the 25 percent who have outside incomes (such as pensions) - adapt themselves to the low earnings that are the rule on the creeks by eliminating as many expenditures as possible and by spending as sparingly as they can when a purchase must be made. Sometimes they have succeeded in saving the price of a needed item without eliminating the item itself. For instance, most miners spend nothing or next to nothing for shelter. Of the 182 men who lived by the streams and who gave information on this point, 73 had tents; 63 had cabins; 23 had shacks; 6 lived in houses (including 1 stone house); 4 lived in trailers; 3 had shelters built on automobile chassis; and 10 (mainly casual laborers) had no shelters. Most of the men living in cabins and shacks had built the dwellings themselves (which is not a difficult task in timber country), and a few had been able to find buildings abandoned by other miners or by construction crews. The majority of the shelters were of poor quality, but some of them showed evidences of a high degree of skill on the part of the occupants, and a few of the dwellings were very attractive. The miners with wives, particularly, had relatively neat quarters, although this was not always true. Most of the older men and the younger bachelors paid little attention to the conditions of their dwellings, but like the others they obtained housing at practically no expense.

Fuel and Water.- Expenses for heat and cooking, and often for lighting, have also been largely eliminated without having to dispense with these services. By gathering firewood from nearby woods, the men get heating and cooking fuel for nothing; and by adapting their waking hours to the sun, they can avoid the purchase of kerosene for lighting. By procuring shelter, heat, fuel, and water free, they eliminate about 25 percent of the expenditures that most families in the lower-income groups must meet.

Medical Facilities.- There are no medical facilities convenient to the miners except those made available by local government agencies. Lack of resources has made it necessary for most of these small-scale miners to depend almost entirely on public health agencies for such care as they receive, even though they pay little in the way of State taxes³

³Automobile, gasoline, tobacco, liquor, and sales taxes are paid to the State.

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and practically nothing in the way of local taxes. One miner was found who had received first-aid training while employed as a steel worker, and he had given first-aid to men living nearby. This was the closest approach to medical assistance found on the creeks. Outside work and the freedom to stop work have probably helped to reduce the amount of medical care needed. But some care is always necessary, and, as the miners can usually spend nothing for medical services, the community must provide assistance from public funds. The adjustment here is made not by getting the service at no cost to anyone nor by eliminating it, but by reducing the amount used and transferring the cost from the individual to the community.

Cultural and Other Values.— Low incomes and relative isolation have, however, resulted in the complete or nearly complete loss of many facilities usually available to city workers. For instance, such cultural facilities as libraries, newspapers, periodicals, books, and music are not common on the creeks. Men have no insurance, no savings, little amusement, and no medical care except that which they get free from the community.

Food.— Expenditures for two items - food and clothing - cannot be eliminated, but they have been reduced to the lowest point possible. Food is sometimes little better than the older miners' stand-by - beans, flour, and dried meat - though canned goods, which are expensive in relation to the income of the miners, are used extensively. In some areas, cull agricultural products are available at very little cost and are relied upon to supply a large proportion of the food. Very few miners raise gardens or hunt. Hunting licenses are expensive, and most of the men feel that if they were to buy guns, ammunition, and licenses their meat would cost more than if they bought it outright, to say nothing of the time spent in pursuit of game.

Clothing.— Owing to the relatively mild climate in most of the California gold fields, the cost of clothing can be kept low. A pair of overalls every few months, a pair of shoes or boots now and then, and a new shirt occasionally are about all that a miner expects to buy.

RELIEF

The poverty of the families and of the men coming to the creeks has made it necessary for most of them to accept relief at one time or another. Because of the unsatisfactory nature of the sample in this respect, it is impossible to estimate what proportion of the 18,000 small-scale placer miners in the country in 1937 had accepted or were accepting

relief. The full-time miners were, of course, receiving very little public assistance. Only 5 of the 198 who gave information on this point stated that they were receiving relief at the time of the interview; none of the 5 admitted mining at the time,⁴ and 3 of these 5 were found living together in one tent. Only 60 of the 198 reported that they had ever received relief money. The average for these 60 was 8 months apiece - 5 months on work relief and 3 on home relief. Full-time miners ordinarily will not be given relief under the rules as they are applied in California; since, however, relief allowances have been higher than the income from mining, men with families may find that relief will provide a better living than placering and may endeavor to get on relief rolls and to abandon mining. For instance, the average payment per case in the month of December 1937 in the northern counties of California was \$6.00 per week as compared with \$3.85 for the median net weekly earnings of all full-time miners (see table 3).

Although full-time miners apparently received little relief in California, intermittent and casual miners doubtless obtained relief. The amount of this relief is not known. Such men received relief after returning from the creeks, but, because of residence and other difficulties, they received little while mining. Men who do not make a living at mining and who cannot find jobs go back on relief if that is possible - not because they failed at mining but because they failed to get jobs.

FAMILY LIFE

Since most miners earn far too little to provide adequate food and clothing for a family, one of the items that must be eliminated for the men who depend on the creeks for a livelihood is family life (unless, of course, the other members of the family are able to do their share of the work). Casual miners who bring their wives to the streams soon leave. Intermittent miners do not rely on the gold gravels to support their families and may not bring their families with them. The full-time miners are the ones affected. In most cases, except for the few who are successful or lucky, and a few of those with outside incomes, the full-time miners either have no families or do not bring them to the creeks. Most of the dependents of full-time miners were wives who did as much work as the husbands. The few children who were found among the families of full-time miners were not receiving an adequate education, medical care, or proper contacts.

⁴If it were to become known, their relief allowances might be either cut or withdrawn.



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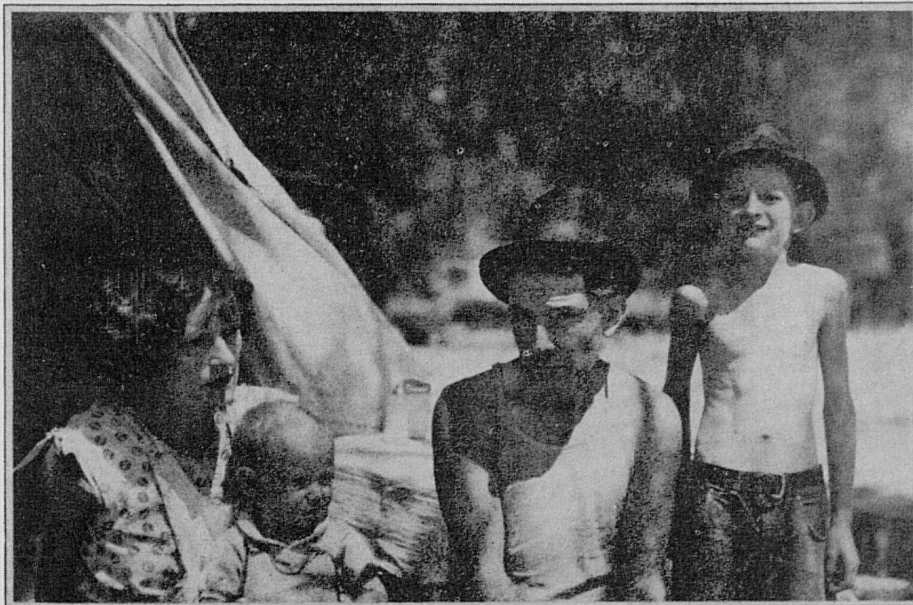


FIGURE 18.— MINERS AND THEIR FAMILIES

The income and environment the creeks provide are usually not favorable to the rearing of children.

COMMUNITY LIFE

The small-scale placer miner generally does not function in the life of the community. The miners visit back and forth among themselves, but they are rarely an integral part of the county in which they live. Most of them are transients as far as the community is concerned, and they consider themselves as such. They do not have the sense of being

part of a community, which is necessary to create a community life of their own, nor do they have the resources to enable them to join in the community life of their county.

Most of the miners pay few local taxes and take little part in the formulation of local policies, but they may receive services, such as maintenance of roads, use of schools, and medical care. Casual workers with families, particularly, may receive more from the community than they give. They come from other areas and contribute but little locally; and if they are sick or if they are living on little-used roads, the county may have to come to their assistance with medical care or do something toward maintaining the roads they use, and provide school-bus service. This does not add to the welcome given by the community to the miners.

In certain instances the miners are a major expense to the counties in which they reside. For example, two men came from a distance and started work in a secluded backwoods area. As they had families and children, the county repaired the roads used by the families and provided school facilities. As the matter was finally worked out, the men were paid to repair the roads (which were used by the two families almost exclusively); one of the men was hired to drive a school bus; and one of the women was hired to teach, though the only children using these facilities were the children of these two families. In spite of this aid, the children, like those of most miners, were being taken care of very poorly. They had very few contacts with current culture; they were living in the backwoods, seeing only their own families, and being taught by a member of one of the families. This is an extreme case, but it does illustrate the type of burden that is imposed on the relatively poor mountainous counties by poverty-stricken immigrants.

MINERS AS VIEWED BY THE MINING COUNTIES

Most mining areas are sparsely settled, and the natives do not find that a living is easily won by tilling the hilly land or by supplying professional or commercial services to people with a small income. Work is scarce and most of it unskilled; the farms are not so productive as those in the lowlands; and the wages are usually low. Consequently, any influx of workers who fail to make a success of mining but remain in the area adds to the oversupply of labor and further depresses wages. Furthermore, many of the immigrants may be more highly skilled workmen than the natives and may underbid them for the few available jobs requiring skill.

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The few available placer bars would help many of the communities to take care of their own local unemployed, but when outsiders swarm in and overcrowd the few relatively good bars available, the communities cannot use placering as a major source of income for their citizens who need relief and must supply some cash. An influx of miners therefore takes jobs away from natives and adds to the number of unemployed who need relief locally.

There are other ways in which an influx of men may cause difficulties. For instance, campers are a potential hazard to the health of many communities, for some of them may contaminate streams that flow into reservoirs used for municipal water systems. Most miners' camps are relatively clean, but a few are filthy, and the communities never know when or where a filthy camp may appear. Shacks also reduce the attractiveness of the area for recreation purposes (a major source of income in some of California's hill counties), and so may reduce the number of tourists from whom some income may be secured. On the other hand, the miners do not see why they should be required to maintain several hundred yards of dirt road to their shacks which they are forced to keep at a distance from the road in order that more fortunate individuals or families may enjoy the beauty of the scenery without being faced by evidences of poverty. Game laws also create a problem. Why, the miners sometimes ask, should they be forbidden to shoot or fish when they need food, in order that more prosperous individuals may be certain of having good sport? Hunting, fishing, and scenery, however, are part of the few sources of income of the mountainous mining areas, and the communities are not eager to have unemployed immigrants injure these assets.

On the other hand, during the harvesting and logging season the miners may provide a source of labor that simplifies matters for the local employers. Crops can be harvested quickly by calling on the miners. The latter also represent reserve fire fighters. Finally, the miners bring considerable trade to the local general stores. They do not buy expensive goods, but they do help the local merchants to keep a steady turn-over of staple goods during the mining season. They bring in some money; they are not entirely a debit to the areas in which they work; and, in general, they are accepted in a friendly fashion.

POSSIBILITIES FOR THE FUTURE

The low standard of living that the creeks can support is disheartening, but the prospects for the future are even more discouraging. The

gold rushes of the late 1840's and the 1850's extracted nearly all of the gold profitably recoverable by hand methods. After 1860 it was necessary to use power methods to earn a living from the auriferous gravels. Following the Sawyer decision of 1884,⁵ even hydraulic mining became unprofitable and was sharply curtailed. Consequently, there has been a period of 50 to 75 years in which gold streams have been mined relatively little or not at all. During these years they have been steadily carrying down minute amounts of gold from the gravels of the old hydraulic operations and have been re-sorting existing bars. This process occasionally results in the creation of thin layers of gravels which, however, may in no way be compared to the deposits found in the early days. If the original rich deposits created over a period of millions of years were worked out in a decade or two, it is easy to see that the thin concentrations created over a period of 50 to 75 years could not profitably employ many miners for very long, and that it will be necessary (with a few exceptions) for full-time miners either to work poorer and poorer beds or to return to isolated areas where there may still be some small gold-bearing bars but where living conditions will be still simpler and conditions for rearing children will be even less satisfactory than at present. Prospects for the future are not bright.

⁵In the Sawyer decision of 1884 the defendants (mining companies) were "perpetually enjoined and restrained from discharging or dumping into the Yuba River . . . any tailings . . . or refuse matter from any of the tracts of mineral land or mines described in the complaint. And also, from causing or suffering to flow into said rivers, creeks, or tributary streams aforesaid therefrom, any of the tailings . . . or refuse matter resulting or arising from mining thereon." (Sawyer decision, Jan. 23, 1884, handed down by U. S. Circuit Court in the case of *Edward Woodruff vs. North Bloomfield Gravel Mining Company, et al.*) This effectively curtailed hydraulic mining, as such mining involves the carrying away of tailings by the streams. In the Federal Caminetti Act of 1893 an organization was set up to determine specifically, case by case, whether each particular hydraulic mine was injuring agriculture by dumping tailings or other refuse matter into the streams. As this act was administered it also tended to limit hydraulic mining further. Recent developments indicate that there will probably be some revival in the industry as a result of a more sympathetic approach to the problems of hydraulic mining on the part of those administering this law, and debris-catching dams are being constructed with Federal funds on certain California rivers.

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CHAPTER VII

THE PLACER MINERS TELL ABOUT THEMSELVES

A study of statistical forms showing gold yields and working time that are filed with the Mint supplies essential quantitative data on the work and income of small-scale placer miners. To obtain a more complete perspective of the lives of these men, however, it is necessary to visit the miners at their work, to talk with them leisurely and at some length, and to learn from them why they are mining, whether or not they want to mine, how they live, how they are able to take care of their families, and how they have fitted themselves into the life of the community. Over 200 miners were interviewed in this fashion, and a brief summary of the interviews with about half of these miners is given here. The results selected for presentation were typical of the entire group. No means were available for checking the statements in detail, but obvious discrepancies and inaccuracies were reconciled or eliminated by the interviewers.

In presenting the accounts obtained in these visits, the interviews with the casual miners are given first, then those with intermittent miners, and, finally, those with full-time miners. Thus the first group of interviews covers the men who come to the creeks for a few days or weeks and leave; the second, the men who make a practice of coming to the streams at regular or irregular intervals; and the third, the men who stay at the streams steadily month in and month out.

In reading about these men, it should be borne in mind that the cost of living varies almost directly with the size of the family. Expenditures for food amount to almost 90 percent of living expenses since clothes cost little and shelter usually costs nothing or next to nothing. Living costs increase, therefore, in almost direct relation to the number of mouths to be fed, and a single miner who makes \$5 a week can provide more satisfactory food for himself than the miner with a family.

CASUAL MINERS

A tent on one of the gold-bearing streams of northern California sheltered two men: one a former cook 59 years of age, and the other a camp baker 38 years old. Being unable to find jobs in their respective trades, both had become "fruit tramps," picking up what work was available to them in the orchards. The younger man had received relief for a short period - 1 month's work on an S.E.R.A. project. The two men, brought

together by the fruit harvest, had decided to try their luck at placer mining in the "off season." They had just set up their tent and had no idea as to what success they would have. If they failed to find gold within a few days, they felt that they would leave and again seek work as agricultural laborers. If placering should bring them an income as high as that derived from work in the orchards, with no greater labor, they thought that they would probably stay awhile. The older man felt that his age had handicapped his previous efforts to secure a job in line with his training and experience. Both hoped that they might eventually obtain jobs as cooks.

A former Illinois coal miner, 54 years old, had established his living quarters in a shack on the American River. He had recently returned from the harvest fields and was more concerned with improving his rent-free shack than in deriving an income from the river. He had canned a quantity of fruit that he had picked himself. During the winter months, when there would not be any work in the fruit fields or orchards, he planned to do some prospecting for lode gold but had no idea how much he might earn.

A young miner, 23 years old, had come to San Francisco after spending 6 months in a CCC camp. Skilled in wood carving, he thought he might find work there, as preparations were being made for the coming Golden Gate Exposition. He could obtain only part-time work, and he shifted to placering between jobs. Thus far, his best day had netted him \$2 worth of recovered gold, and a month's work only \$25. Although he expected to derive most of his income from carving, he planned to continue placering on a casual basis.

Four miners, joint owners of an automobile, were camped in the open along the Feather River. These men spent relatively little time washing gravels. Sharing the results of their labor equally, each reported a daily income of 35 cents. The apparent leader of the group, 53 years old and a blacksmith, said: "There ain't much call nowadays for old-fashioned blacksmiths." He added that he had done some prospecting for lode gold. The second man, a former store clerk, 67 years old, had been placering off and on since 1931. He had been out of work for several years and felt that he was too old to obtain a job. His income from placering was supplemented by a small pension. The remaining two members of the group were a boy of 17, who had never done work other than placering, and a young man of 22, who said he was a lumberjack. The boy said that he would like to get a full-time job at wages, and the young man stated that he would return to lumbering whenever he could get a job.

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A woman, about 40 years old, reported that she had come to California from the East to get away from the cold climate. As she owned a ranch that paid \$500 a year rent when the tenants were successful, she was ineligible for relief. Although she received little income from placering, she said that she would continue living on the creeks if the rent from the ranch came in regularly. She also said that she would return to work if she could get a job as a boarding-house manager. Her placering had yielded about 5 cents' worth of gold for 4 hours' work a day.

Three miners, 68, 69, and 74 years old, respectively, were panning for gold along the Stanislaus River about a mile from the highway. The oldest man of the three said that he had first learned the trade of hard-rock mining in the eighties and had followed it off and on ever since. After many years' work as a miner, he was now too old for work underground. He recovered about 10 cents' worth of gold per 6-hour day and received a monthly pension of \$27.50 as a Spanish-American War veteran. The 69-year-old miner had been a millwright but was now too old to obtain a job. He recovered about 30 cents in gold a day, but he had a small savings account from which he received interest. The third member of the group was a cattle rancher who received a small income from his ranch but was too old to work it actively himself. He placered about 4 hours a day and estimated that he made about 4 cents an hour. The section of the river on which the group were panning flowed through his property.

A father and son, aged 43 and 20, were camped in a tent on a creek-bank. The former had been a laborer in Nebraska until 1936 and had been unemployed since that date except for a WPA job which had lasted 14 days. Both men had recently come to California to look for work. They had been unable to find employment and had turned to placering but reported they did not make enough to live on. The son had been a truck driver and preferred truck driving to placering.

Four brothers, aged 54, 56, 58, and 60 years, respectively, lived in a cabin on a claim they had staked on one of the auriferous gulches of Siskiyou County. Prior to 1930 these men had been employed in the State of Washington. After about a 4-year period of unemployment, they had moved to Montana in 1933 and had taken up placer mining. Having had little luck at this and not liking the cold climate, they had migrated to California where they worked in the harvest fields. They were able to save some money and decided again to try their luck at placering. After 2 months' work they had recovered only 1 ounce of gold, or less than \$4 each per month. Unless their luck changed, they would find it necessary to seek work at wages.

A family of three - husband, wife, and a 2-year-old son - had recently arrived in California from Pennsylvania and were living in a relatively well equipped, one-room shack. The 44-year-old husband stated that he had come to California in the hope of improving his health and not to seek gold. He had been an electrician and had considerable knowledge regarding the use of tools. He estimated that he worked at placering two 5-hour days a week and made 75 cents to \$1 a day. His main support, however, was \$70 a month which he received for disabilities incurred in the World War.

Another family, living in an improvised house built on a truck, was camped on one of the larger rivers. In 1937 this family had leased its farm in Washington for \$125 a year and had come to California. After work in the harvest fields picking fruit and cotton, they had been attracted to placer mining by the stories of fabulous discoveries. However, the father, a man of 50, stated that their recoveries were only \$0.50 to \$1.50 each per day for himself and his 24-year-old son and that they would probably return soon to the farm.

A married couple that had just started placering in partnership with a man who already owned a claim reported that they had no idea what their success would be. The husband was 42 years old, a radiator repairman, and had been employed for 6 months on a WPA project. He said that he would be glad to give up placering and return to his trade whenever he could obtain a job.

Another couple had come from New York to California in search of work and had turned to placering when a job was not obtained. The husband, a mechanic by trade, suffered from a failing memory owing to a wound received in the World War. He had worked for 3 months on a relief project before coming west. His gold recoveries were only a few cents a day, and it appeared certain that he would not obtain any considerable income from placering.

INTERMITTENT MINERS

Intermittent miners are those who follow a more or less regular schedule, such as going to the harvest fields and the gold streams in season. They also include men who live in nearby towns and who work the streams when their industries are shut down, or between jobs. The average earnings are usually somewhat higher and the skill and equipment better than among the casual workers.

The men who were placering between periods of employment included a carpenter 61 years of age, who was prospecting a gulch in Mariposa

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Four miners along a creek building proje would then re work relief we man in the gr a 5-day week \$30 a month d cept any work 34 years old,

County. He preferred prospecting for gold pockets to placering and placered from time to time only to obtain the resources for prospecting. The greater possibility of locating a major discovery by prospecting made the latter more attractive than placering. He said that he had been on relief recently for 6 months and would be glad to return to carpentering if he could get a job.

The duties of a caretaker of a small estate were such that he had time to placer intermittently. He was a California resident, 56 years old, and had placered from time to time for 12 or 14 years. The gravel he was working yielded about 62 cents of gold per yard, but it had to be carried 75 feet to a sluice box on the bend of the river. He was able to wash a little over a yard a day and made about 75 cents for each of the six 8-hour days he worked each week.

A former plasterer, aged 47, reported that he made about 50 cents a day at placering. He stated that he had obtained work as a plasterer on a WPA project for 6 months in the preceding year and that he expected to work again as a plasterer whenever jobs were available.

A 61-year-old miner reported that he had been doing part-time placering since 1896. He had worked as a laborer in logging camps; although he was now too old for that sort of work, he still obtained contracts for cutting firewood. His income from mining and cutting firewood was supplemented by odd jobs, and he had worked for 18 days on an S.E.R.A. project and 7 weeks on a WPA project.

In Placerita Canyon, Los Angeles County, a 65-year-old caretaker of an old stone house reworked some of the gravels that had been washed a century before. He reported placering off and on between various jobs since 1895 and said that sometimes he made as much as 50 cents a day.

An unemployed cook, 59 years old, said he worked at placering intermittently. He estimated that he earned about a dollar a day for the 50 days that he worked at placering over a period of 5 months.

Four miners maintained their living quarters in a tent and a shack along a creek. Three of them said they had jobs on the local WPA road-building project but that they expected to be laid off in a few days and would then return to placering. They reported that their earnings on work relief were greater than their earnings at placering. The youngest man in the group, 26 years old, said that he worked a 7-hour day and a 5-day week when he mined and that he made about \$1.40 a day and about \$30 a month during the 3-month season. He had no trade and would accept any work he could get at fair wages. Another member of the group, 34 years old, said he was an unemployed rig builder from the oil fields;

he estimated that he worked a 6-hour day, 6 days a week, and that he made about 50 cents a day at placering. The third member of the group was a laborer of about middle age who reported that he worked 4 hours a day and 5 days a week and made about \$1 a day at placering. The fourth member, who did not have a WPA job at the time, gave his age as 48 and his trade as making railway ties. He said he would be glad to work at wages if he could find a job. He used a $\frac{1}{2}$ -horsepower centrifugal pump in placering and worked an 8-hour day, 7 days a week. He estimated his earnings at about 75 cents a day, or \$200 a season.

A miner, living in a shack he had constructed from available discarded materials, reported that he placered between odd jobs. He reported his earnings as about 75 cents a day, though sometimes he had better luck and once had found \$18 worth of metal in a day. He said that he had been on relief projects occasionally and estimated that he had received relief work about one-third of the time over the preceding 3 years. He said he had worked as a navigator and a chemist and would accept any kind of work at regular pay.

A 39-year-old miner lived in a tent on the American River. He was an unemployed plumber who took odd jobs whenever he could get them, and he ordinarily spent several months in the fields during the harvest season. He followed placering whenever no other work was available and estimated that he made about 50 cents a day and \$100 a year on the creeks. He had an old-model automobile that was essential in following the rotation of his occupations.

A former sign painter, 59 years of age, moved small boulders in order to get at the gold-bearing sands under them. He had worked at his trade as a sign painter in Minnesota as late as 1930. He came to California when his business failed him completely and he was unable to find employment at his trade. He worked in the harvest fields during the season and at the gold creeks between seasons. He also had worked on a WPA project for 3 months. He placered 5 hours a day, 7 days a week, and estimated he made 25 cents a day or \$25 for a 100-day season.

An unemployed chauffeur, 33 years old, had started placering in 1927 after he was unable to obtain a position. He did odd jobs for wages, prospected for lode gold intermittently, and had a small income from interest on savings. He estimated that he made about \$1 a day placering for a 100-day season.

A 29-year-old lineman had come to California from New York partly because of what he had heard about the gold mining and partly because he wanted a change. He hoped to get back to work at wages. He had a

dependent mother's pension, which was a small amount. The lineman estimated

A hard-rock miner had been placering to the west of the vein. The vein was narrow and he had a shoot that could be made about \$200 per year.

A miner planning to placering had worked on the American River. He decided to try placering. He worked 40 hours a week since he spent a lot of time on income from mining.

A 52-year-old miner had been placering intermittently since 1930. He had a small engine. He worked about 6 hours a day and reported his earnings at about \$1 a day.

A miner, aged 29, had been in Mariposa County for several years hunting, but when he turned to regular work he worked 6 hours a day for \$12 a day, or \$120 a season.

One miner worked in the mountain villages and towns. He had been in placering for several years. He had certain bars after the harvests are finished. He was entirely on the American River. He had no expense for placering income. He had been in the American War veterans' hospital.

A hard-rock miner had been placering since 1930. He had a higher income from placering about 90 days a season.

A former carpenter had been placering a creek. He said

dependent mother and a father living with him who received a \$50-a-month pension, which was considerably more than the father made from mining. The lineman estimated his income from mining at about \$1.50 a day.

A hard-rock miner, 28 years old, was trying to make enough money out of placering to develop a small vein he had found in the nearby hills. The vein was narrow and the ore bunchy, but he hoped that he could find a shoot that could be worked profitably. He estimated that he made about \$200 per year at part-time placering.

A miner panning on the Feather River was a former electrician who had worked on the construction of Boulder Dam. When this work ended, he decided to try placer mining in California. He estimated that when he worked 40 hours a week at placering he made about a dollar a day, but since he spent about half his time prospecting for lode gold his annual income from mining was only about \$150.

A 52-year-old former machinist reported that he had followed placering intermittently since 1920 and that he had not worked as a machinist since 1930. He had built himself a dredge with a 2-horsepower gasoline engine. He worked a 3-hour day and 5-day week during the 4-month season and reported his income as \$300 to \$400 per season.

A miner, aged 28, panned in search of rich pockets of gravel in a gulch in Mariposa County. He said he did some crevice- as well as pocket-hunting, but when his luck at finding more concentrated gravel failed, he turned to regular placering of low-grade gravels. He estimated that he worked 6 hours a day and 7 days a week and that he made about a dollar a day, or \$125 for intermittent work during the 6-month season.

One miner worked the streams intermittently between trips to nearby villages and towns where he sharpened scissors and knives. His work in placering consisted mainly of gathering thin layers of sand from certain bars after each period of high water. Opportunities for such harvests are limited because the presence of workable sands depends entirely on the rains and floods. He slept in his automobile and had no expense for shelter. In addition to his tool-sharpening and his placering income, he received a monthly pension of \$35 as a Spanish-American War veteran.

A hard-rock miner, 34 years old, said that he had placered intermittently since 1931. He found, however, that he could make a somewhat higher income from trapping during the open season. He worked at placering about 90 days a year and made about a dollar a day at such work.

A former carpenter, 63 years old, lived in a well-built cabin near a creek. He said that he still did some carpentering in his home town,

Pasadena, during the winter months but that he was getting fewer and fewer jobs because of his age. He had a small income from savings and investments and owned his placer claim. He planned to placer in the summer and spend the winter with his wife who stayed in Pasadena throughout the year. Test runs on his placer claim yielded recoveries ranging from \$0.50 to \$6 per day, and installation of a gasoline-powered pump was contemplated.

A couple living in a trailer along the Yuba River near Timbuctoo had better than average success at placering. Newly formed bars in the river after a rainstorm had yielded well for several days and one day had netted \$22. This windfall enabled them to build and equip their trailer. Both man and wife worked at placering 4 hours a day, 6 days a week. They estimated their joint income at \$3 a day, or \$500 a season. The husband was a pipe fitter and machinist's helper by trade; the construction of the trailer indicated that he was definitely skilled in construction and in work with tools. He had worked for one of the larger petroleum companies in California until 1930, as an agricultural laborer from 1930 to 1934, and had not taken up placering until 1935. This couple felt that they had adopted the trailer-house mode of living for the rest of their lives but were not sure as to how long they would continue placer mining. Their only relief experience had been 3 months' CWA work in 1933, when the husband had helped clear the wreckage of the Long Beach earthquake.

A former pipe fitter, 51 years old, and his wife were camped in a tent on the Yuba River. The husband had had no regular work since 1933 and for several years had placer mined between periods of employment as an agricultural laborer. He had also worked 12 days on a WPA project during the preceding year. The couple estimated their income from placering at about \$2 a day, or \$400 a year.

At one operation a man and wife were both digging heavy auriferous clay preparatory to washing it. Mining was only one of their activities, for they also served as caretakers of a large, vacant residence for which they received the use of a house rent free and the right to cater to tourists in the summer and to placer without payment of royalty. The man, who gave his age as 59, had been a cook in San Francisco restaurants until 1931, when failing health had caused him to seek open-air work. His health had been restored, but he doubted whether he could again find work as a cook. His wife, 30 years old, was doing fully as much of the hard work as her husband and said she worked 8 hours a day and 40 hours a week at placering in addition to her household duties

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that included the care of four children. The couple were able to recover about \$2 a day from placering, or about \$200 annually. They estimated their income from a roadside stand at about \$100.

Two families had joined their resources at one place on a stream in order to conduct better the business of mining. These families lived on adjoining plots - one in a tent, and the other in a trailer. The husbands, 49 and 56 years of age, had been laborers in the oil fields of southern California. The younger man had been employed regularly up to 1930, but the older man had lost his job in the oil fields before that. They had hoped to make the equivalent of at least low wages by placering with machinery, but their capital was not adequate and they felt they would have to give up mining soon unless they could considerably increase their gold recovery. These men had obtained permission to work the stream without royalty, had installed a 3-horsepower gasoline engine and a centrifugal pump, and were making \$1.25 to \$1.50 a day each in a 6-hour working period. They had been mining $3\frac{1}{2}$ months and had earned about \$100 each. One had an outside income of \$52 a month, and the other, an income of \$10 a month, both from the rental of property in southern California.

A man, his wife, and two children were all engaged in working gravel in a dip box. The family lived in a nearby town and made a daily trip to the stream for placering. Two older children were in school, and the two younger ones, not of school age, were carrying water to the dip box. The husband said they made about \$1 a day at the dip box and worked 75 to 100 days a year at times when he did not have odd jobs in town or when he was not working the harvests as a fruit tramp. This family hoped to be able to purchase land and to take up farming.

A man who lived with his wife in a tent on the American River worked regularly in a nearby town while his wife placered. The husband sometimes placered also on Sundays and holidays. The couple had done small-scale mining when the husband was out of work, and the wife liked it so much that she continued after her husband had secured a full-time job. She made only about 25 cents a day but found the work interesting.

One young man alternated mining with logging. He drove a caterpillar tractor in logging camps during the logging season. His income from this work was about \$600 a year. He estimated that he made about \$100 in mining in the interval between logging seasons and had the benefit of low cost of living along the rivers at the same time. His wife went with him to the placer diggings; their home was usually a tent.

FULL-TIME MINERS

Among the men who spent most of their time at placering was a 57-year-old experienced miner who lived in a cabin beside the Klamath River. He had been born within a few miles of his cabin and, except for a short period when he had traveled through the Western States as a miner, had spent all his life on that section of the river. He was representative of the experienced miners who made it possible for newcomers to mine by helping them find placer beds and teaching them the art of placering. He had prospected for lode gold for years and had driven short adits along quartz stringers, but this work had yielded nothing of commercial value. He estimated his annual income from mining at about \$300. He also did a small amount of farming, received \$70 or \$80 a year for farm products, and maintained a vegetable garden and a cow.

A former farmer, 70 years old, placered regularly on the Stanislaus River. He had migrated from Colorado to California to live in a milder climate. Placering yielded him about 10 cents per 6-hour day, and this small return was supplemented by an old-age pension of \$15 a month.

A miner, crippled by the loss of an arm and a leg, supplemented an \$8-a-month pension principally by placering. He worked at mining about 7 hours a day, 42 hours a week, and 150 days a year, which he thought yielded him about 75 cents a day and \$125 a year. In addition to placering, he sometimes picked over old lode-mine dumps in search of pieces of ore that had accidentally been sent out to the dumps as waste. He also did odd jobs whenever such work was available.

A miner, 74 years old, reported that he had been a farm hand in his youth but had followed placering intermittently since 1915 and was now doing it steadily, as his age precluded his securing any kind of work for wages. He owned several burros used for bringing supplies from town, but it took 4 or 5 days to make the round trip. He earned 30 to 35 cents a day at placering and estimated his annual income, all of which was from mining, at about \$90. His earnings were supplemented by food allotments and public assistance received from time to time.

A miner, 46 years old, said that he had worked as a fruit tramp but that wages in the fruit harvest were so low that his earnings of \$1 a day at mining were about equal to what he had made as an agricultural laborer. This man had migrated from New York to California and had followed placering regularly since 1926.

The claim of one 72-year-old miner lay along the banks of the Trinity River in California, and he lived in a nearby cabin. This man had come to California in the late eighties and had worked at placering "off and

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on ever since." His occupational history included work as a tile setter and as a rancher. Although handicapped by a crippled hand, he worked 12 hours a day, 6 days a week, and estimated his income from mining to be 75 cents a day and \$125 a year. A small supplementary income was obtained from rental of a ranch he owned.

An old-timer, 85 years old, worked deposits on the Illinois River in Oregon. He reported that he and his son (a mental defective) had been able to maintain themselves on their earnings from the gravels.

A miner, 64 years old, said he had placered off and on since 1913 and that he had turned to placer mining full time after he was no longer able to follow his trade of tinsmith because of an injured hand. He sought small patches of rich gravels because, he said, "Sometimes the old-timers got a little drunk and forgot to clean up the bedrock good." His earnings, which were perhaps \$50 a year at this sort of work, supplemented a \$6-a-month pension that he received from the county.

A former baker and operator of vegetable-dehydrating machines, 64 years old, said he began placering when he was not able to obtain a regular job. He worked about 250 6-hour days a year. After payment of a small royalty to the owner of the gravel, his annual net income was about \$120.

A former truck driver and mechanic, 41 years old, said failing eyesight was seriously handicapping his mining. He paid a small royalty to the owner of the gravels and reported earnings of \$150 to \$200 a year.

A hard-rock miner who had migrated to California from Butte, Mont., lived in a small, well-built cabin near the Yuba River. This man, 74 years old, said he had done a little placering off and on since 1902. He worked 6 hours a day and about 40 hours a week, used a rocker, and estimated his earnings at 35 cents a day. He also received a \$30-a-month pension as a Spanish-American War veteran and indicated that he could live comfortably on his pension and placer earnings.

Two men worked a large open pit to bedrock where they expected to find gold concentrated. One miner, 41 years old, said he had been a truck gardener in Illinois in 1930 but had come to California to mine gold in 1933 because of the stories being circulated about the gold possibilities in the State. The second miner was past middle age and received a pension. The younger man reported he recovered about 30 cents' worth of gold in a 6-hour day and worked at placering about 36 hours a week. The older man did very little mining and spent most of his time caring for the shack in which the two men lived.

One miner who used a $\frac{3}{4}$ -horsepower gasoline engine with a pump reported that his income was only 50 cents a day. He had lost his business during the depression, had worked as a common laborer with little success as he was nearly 60 years old, and had finally turned to placer mining.

A former carpenter, 47 years old, said he had been unable to obtain work at carpentering because he was "no longer strong enough for the work." Unlike most of the men on the creeks, this man worried a great deal about the future. He had a 4-horsepower gasoline engine and centrifugal pump, worked 5 hours a day, 5 days a week, and said his earnings averaged about 75 cents a day.

An energetic woman of about 40 shoveled gravel near her cabin on one of the smaller creeks of the Sierras. Other miners in the area said she could shovel as much gravel as any man in the district, and one called her "the best man on the creek." She said she worked 6 hours a day, 7 days a week, and averaged 50 cents a day. In addition to placering, she also prospected for lode gold. This woman had formerly been a real-estate agent but preferred placering and never expected to change to any other kind of work.

A one-armed laborer, 64 years old, lived in a small, neat cabin. He received a county pension of \$10 a month and earned about 50 cents a day placering. He also prospected for lode gold and had found some quartz veins which he hoped might be developed.

A 42-year-old unemployed automobile mechanic, who placered in Mariposa County, Calif., had migrated from New York in 1930. He had financed the trip largely by trading tools for gasoline and food from time to time. Loss of the tools, however, destroyed his ability to work as an automobile mechanic because such workmen are required to furnish their tools. He reported making 50 to 60 cents a day at placering and worked 7 hours a day, 6 days a week. This man had saved several nuggets for which he hoped to receive a premium from some collector because of their odd shapes. He also prospected for lode gold in the hope of finding something that could be sold for enough cash to enable him to replace his tool kit and to finance a search for a regular job.

A vineyardist said he had begun placer mining after he had been unable to keep up payments on the vineyard he was buying. He worked about 7 hours a day and reported average daily earnings of about 50 cents.

An unemployed water-well driller, 55 years of age, worked gravels in a gulch in Mariposa County. He used a $1\frac{1}{2}$ -horsepower engine and centrifugal pump, worked 8 hours a day, and made \$0.50 to \$1 a day during the 6-month season. This man also did odd jobs when such work was available and prospected for lode gold.

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A relatively rich find near Gold Hill, Oreg., that produced a return of about \$2,800 in one year was reported. The man who made this discovery had been placering regularly since 1926. Unlike most small-scale operators, this miner arranged to work relatively rich, privately owned gravels on payment of 20-percent royalty. He said he made \$2 to \$3 in a 6- to 7-hour day, worked about 200 days per year, and pointed out the advantages of this arrangement over working the low-grade materials.

Two partners, 48 and 55 years old, worked areas adjacent to their well-built, small cabin. The younger man had never worked at a trade and said he preferred placering at \$1 a day to higher wages working for others. The older man was a former bartender who had the same attitude toward mining. These men had worked together for several years, and their records showed that they had made \$400 in 1937 after paying 15-percent royalty to the owner of the land that they were working. They had put in a large amount of labor in building a long drainage ditch that enabled them to drive a drift to the bedrock of the creek they were working without having to pump water. Such a large investment of labor was uncommon along the creeks.

A hard-rock miner, 40 years old, working on the Yuba River, supplied his sluice box with water by means of a small wing dam. He had built a cabin and had been placering for 10 years. He worked 7 hours a day for a 5-day week and reported average earnings of \$2 a day for a working year of 200 days.

A former farmer, 48 years old, lived in a truck which was well fitted for camping and prospecting. He had followed placering intermittently for 30 years and decided to follow it regularly when the price of gold was increased to \$35 an ounce. The truck carried all the simple devices, such as sluice, dip box, and rocker, that are needed for small-scale placering. This man had made about \$5 a day, or about \$1,200 a year placering in Nevada.

Two young men worked a bench bar, containing several hundred yards of gravel, high above a stream. They had built a chute leading down some 40 or 50 feet to the water's edge and had staked a claim to avoid difficulty with other miners should the word spread of the possibilities of mining on the bar. They had a small pump and other equipment to use in mining. Each was making about \$1.50 a day at this operation and expected to make \$500 the first year.

Three men worked together moving boulders weighing many tons in order to obtain access to the underlying gravel on bedrock along the shore of a river in northern California. One of these miners, 36 years old, owned the land on which the work was being done. He had followed placering

for many years, had prospected for lode gold, and reported earnings of about \$5 a day at his present operations. His mother, a dependent, lived with him. A second worker in the group, 49 years old, was an unemployed deep-sea diver. He had done placering for 4 or 5 years but said he would return to full-time diving in San Francisco if he could obtain such work. The third worker in the group, 34 years old, was a widower with three children, who had been a farmer in Washington and



FIGURE 19.— A PLACER MINER SOMETIMES COMBINES RESOURCES WITH HIS NEIGHBOR
Two can often work the gravels more effectively together than separately, and miners sometimes form partnerships with their neighbors. The partnership of the men in the upper view covers mining only, and each man maintains his separate living quarters and does his own cooking. The partners in the lower view also share living quarters and housekeeping duties.

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had lost his farm through foreclosure early in the depression. A job that he thought had been offered in California failed to materialize, and he had turned to placering. He worked 10 hours a day, 5 days a week, and estimated his earnings at about \$1 a day. His children were with him, and he managed to support them.

Another group of three worked one of the larger flats 10 to 20 feet above the bed of the Trinity River. This bed had been worked in earlier mining but still produced some gold. A simple hydraulic mining outfit had been devised by bringing water from a high nearby stream. The oldest of the trio, a man of 54, had worked as a clay and quartz miner in Wyoming and had come to California in 1932 to try placering when he was unable to secure employment. He paid a rental for his cabin that included the right to placer the ground being worked. He mined about 6 hours a day, 5 days a week, and estimated that he made about \$2 a day and that his two co-workers made about the same amount.

Two partners were interviewed in front of their neatly maintained tent. The older of the two owned the land they were working and said they worked a 5-day week, with earnings for the two of them totaling about \$3 a day and \$800 a year. This man had been a dairy farmer who had lost his farm through foreclosure early in the depression. The younger partner had followed placering intermittently since he was 16, had studied mining engineering at the Colorado School of Mines for 3 years but had not been graduated, and had done no regular work since the World War, of which he was a veteran.

An ingenious miner had constructed a dredge that floated on four portable pontoons and had made a pump out of the housing of an automobile differential and a rear axle. Water and gravel were delivered to a small sluice box on the boat. This operator worked an 8-hour day and a 6-day week when weather conditions permitted. He estimated that he made \$3 a day when operating but that his working year was not more than 150 days. This man had been placering since 1930 and contributed to the support of his aged father who lived elsewhere.

An unemployed blacksmith and acetylene welder, 44 years old, said he began to placer regularly when he was unable to obtain employment. He had mounted a small pump and engine on a wheelbarrow so that it could be moved easily from one digging to another. He worked a 5-hour day and 6-day week and estimated that he made \$3 a day and \$500 a year.

A 72-year-old former blacksmith, who mined 8 hours a day, 7 days a week, estimated he made about \$200 a year. He had qualified for a pension under the old-age public-assistance plan of the Social Security Act and expected to do less mining in the future.

An unemployed shoemaker, 65 years old, continued mining, from which he received only 40 cents a day, although he had supplementary income from a pension. Another miner received a \$50-a-month pension as a Spanish-American War veteran but also continued mining gravels that yielded about 75 cents a day.

One miner, 54 years old, said that he had been graduated as a mechanical engineer from a large eastern university and that he had been an all-American fullback on his college team. He had been a building contractor in southern California and said his income had been as high as \$10,000 a year. He expected to return to engineering but explained that placering and prospecting fascinated him and that he had no other occupation at the time. The area he worked contained large nuggets and his earnings fluctuated widely, but he estimated them to average about \$1.45 a day.

One miner shoveled gravel into a bucket and then carried it 20 to 30 feet to a pump tom. This man owned his claim and had placered since 1932. He reported earnings as high as \$5 a day and \$500 to \$600 a year. He had served in the army and had worked as a general mechanic for a large oil company. He had lost the last-named position because of difficulties with a superior. He owned a well-built home with a modern range, rugs, and other conveniences not usually found on the creeks.

A former quartz miner, about 40 years old, reported he made about \$3 a day and \$400 a year from placer operations. He lived in a tent and owned an old automobile. He said that he had acquired silicosis from breathing in rock dust in underground mines. As silicosis has become a compensable occupational disease under workmen's compensation laws in an increasing number of States, most mines refused employment to this man, and he had been unable to obtain work as an underground miner.

A French Canadian, 67 years old, shoveled gravel so industriously and for such long hours that his neighbors called him "the human steam shovel." He had always been a common laborer and reported earnings of \$1 a day at placering.

An unemployed carpenter, 43 years old, reported earnings of \$1 a day from placering. This man had had no regular work since 1930, and from his meager earnings at the creeks he contributed to the support of a daughter of minor age.

A father and son used a small power outfit to aid their mining on the bank of the Trinity River. The son, 33 years old, said he worked 9 hours a day, 50 hours a week, and made about \$100 a year. The father, 76 years old, worked 6 hours a day at mining and also did most of the

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cooking. Both men had worked on a relief project, and the son had spent 2 months in a CCC camp. The father did not know whether he should regard his wife as a dependent as he could not send her anything out of his average daily earnings of 40 cents. He said, "She's got to take care of herself same as I am doing."

A World War veteran, 48 years old, and his wife had placered since 1927 and expected to continue indefinitely. Both husband and wife worked about 4 hours a day, 6 days a week, with a dip box. They estimated that together they earned \$150 a year. The veteran received a pension of \$54 a month, and he said that he and his wife could live on that plus their mine earnings but that the latter alone would not support them. The man had been an automobile mechanic, but injuries received in the World War made it impossible for him to do such work.

An elderly couple, working gravels along the Salmon River, said they made about 20 cents a day. They received considerable financial aid from a son who worked in a bank in a California city. The husband, 59 years old, had been a doctor in Kansas but had abandoned his practice and become a contractor. He had worked in several States and migrated to California in 1930 after he had been unable to obtain employment in Colorado. A badly crippled arm made any kind of physical work difficult for him.

A young miner said he had taken up placering in 1930 in Mariposa County, along with a large number of other jobless men. For a time, this group was permitted to work a tract of privately owned placer land under an agreement that they would pay royalty when their daily incomes exceeded a certain amount and that any big strike would be taken over by the owner. This miner had not earned enough to pay the specified royalty. At the time of the interview, this miner lived with his wife and two children (9 and 10 years old) on a claim he had staked. Every morning he rowed the children across the river and left them to await the school bus in a little shelter he had built by the side of the highway. He estimated his income at \$1 a day or \$300 to \$400 a year. His previous occupation had been resawing in lumber mills, and he also did odd jobs. When asked if he planned to return to his trade, he said, "Don't know; depends on how I make out here." When it was pointed out that resawyers were paid much more than \$1 a day, he added, "Oh, I don't want to quit mining; I just mean I might be starved out and have to go back to wages for awhile."

A 55-year-old miner and his wife said they both worked regularly at placering. Their 16-year-old daughter did no mining. The husband was

an unemployed house painter; he was also a World War veteran and had received a pension until 1933. This family had received home-relief aid regularly for more than 5 years. The income of the family from placering was \$2 to \$3 a week.



FIGURE 20.— MINERS FREQUENTLY BEGIN WORK WHERE OTHERS ARE ALSO DIGGING
Several miners frequently work within a relatively small area. One miner may have obtained a good day's recovery and the news brought others, or the fact that one man was digging in a certain area seemed adequate evidence that that particular place was a good place to dig.

A man of 69 said he was unable to obtain work as a draftsman so he was keeping in a tent that were offered a pension of \$30 a

An elderly couple obtained a change in The husband had was too old to ob camp provided th that placering yie

A family of five a cabin near the 51 years old, was employed since 19 do odd jobs under could be cared for placering. The r a day, but the fat World War veteran.

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A man of 69 said he had started mining in 1933 after he had been unable to obtain work. He had placered in Alaska in 1898 but had worked as a draftsman since 1900. This miner and his wife had set up house-keeping in a tent. The wife did no mining but made beaded articles that were offered for sale to passing motorists. The couple received a pension of \$30 a month.

An elderly couple said they had come to California from Washington to obtain a change in climate and had drifted into gold mining by accident. The husband had been a carpenter and a railroad man, but he said he was too old to obtain such work again. An only son who worked in a CCC camp provided this couple with a \$25-a-month income. They estimated that placering yielded them 15 to 25 cents a day.

A family of five, including two boys 16 and 18 years old, lived in a cabin near their diggings on one of the gold creeks. The husband, 51 years old, was a gas pipe-line construction worker who had been unemployed since 1930. The younger boy was mentally defective but could do odd jobs under supervision; the relative ease with which the boy could be cared for in the country was one of the reasons the family was placering. The returns obtained from mining did not exceed 25 cents a day, but the father received a \$30-a-month pension as a partly disabled World War veteran.

A 64-year-old miner and his wife used a dry washer in working a claim in the arid hills north of Randsburg. The husband had been doorkeeper in the United States Senate chamber when his uncle was a United States Senator from North Dakota and had later been in the real-estate business. He took up placering in 1932 after he could not obtain other work. His wife said she was 55 years old, helped her husband at mining, and enjoyed living in the desert. The annual earnings of this couple, which were about \$200, were supplemented by home relief.

An unemployed cement worker, 49 years old, had migrated with his wife from Chicago to northern California. He had purchased the claim that he was mining. He worked 10 hours a day, 250 days a year, and averaged about \$1 a day which supported himself and his wife. This man thought the possibility of his returning to work at his trade was remote.

A 64-year-old miner and his family of four lived beside a tributary to the Klamath River. This man and his 16-year-old son estimated that their joint earnings from placering were about \$10 a week. The father was an unemployed automobile salesman and had had no regular work for more than 2 years. This family had received WPA help for 18 months in the past and at the time of the interview were receiving \$46 a month in home relief.

A disabled World War veteran reported that his placering yielded about 75 cents a day, which supplemented a Federal pension of \$100 a month. He moved from place to place along the creeks, and his wife and seven children, the oldest of whom was 14 years, lived with him. This man had received considerable vocational training and listed his trade as aviation mechanic and pilot.

A large, well-built cabin near the Trinity River was occupied by a small-scale placer miner and his wife. The cabin was an old structure that they had remodeled into a relatively comfortable home. The husband, 48 years old, was a World War veteran who had been an automobile mechanic until his health failed. The wife aided the husband in mining, but their earnings were only a few cents a day.

An unemployed truck driver, aged 53, had rigged up an automobile engine to a centrifugal pump. He had also constructed a derrick strong enough to lift several tons, which enabled him to get at the gravels buried beneath large boulders. He estimated that he earned about \$150 a year by placering. His income from mining had been supplemented from time to time by work on relief projects.

A former farmer, 58 years old, who was living with his wife and 4-year-old daughter beside one of the creeks of northern California, had formed a partnership with the owner of a claim and had installed much larger power equipment than was ordinarily used by small-scale miners. This consisted of a 60-horsepower engine and a scraper to bring gravel to his sluice box. His income from mining averaged \$2 to \$2.50 a day. This man had mined steadily since February 1933. When asked if he would return to farming, he said, "I come awful near it last summer."

The partner of the aforementioned miner, 55 years old, said he was an unemployed construction engineer. He believed that his age would make it difficult to obtain further work of this type. This man also had his family with him and had come to California from Oregon in 1935 after reading newspaper stories of wonderful successes in placering.

A former teacher in a private trade school in Los Angeles mined along the Yuba River, together with his wife. The husband, 50 years old, shoveled gravel while his wife carried water from the river to wash it through the box. This man said he had earned \$2,000 a year before he lost his position in 1930. The income of the couple from mining was about \$450 a year. Their two children lived with relatives.

A widower, 36 years old, shoveled into a pump ton along the Yuba River. Since 1931 this man had supported his four children by placering. He worked 7 hours a day, 7 days a week, in addition to taking care of the

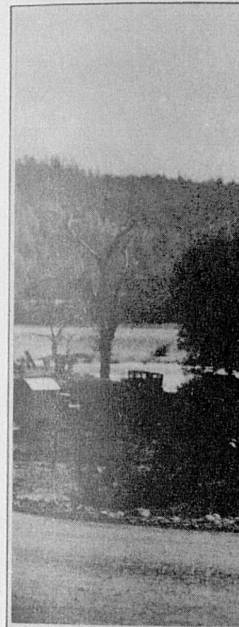


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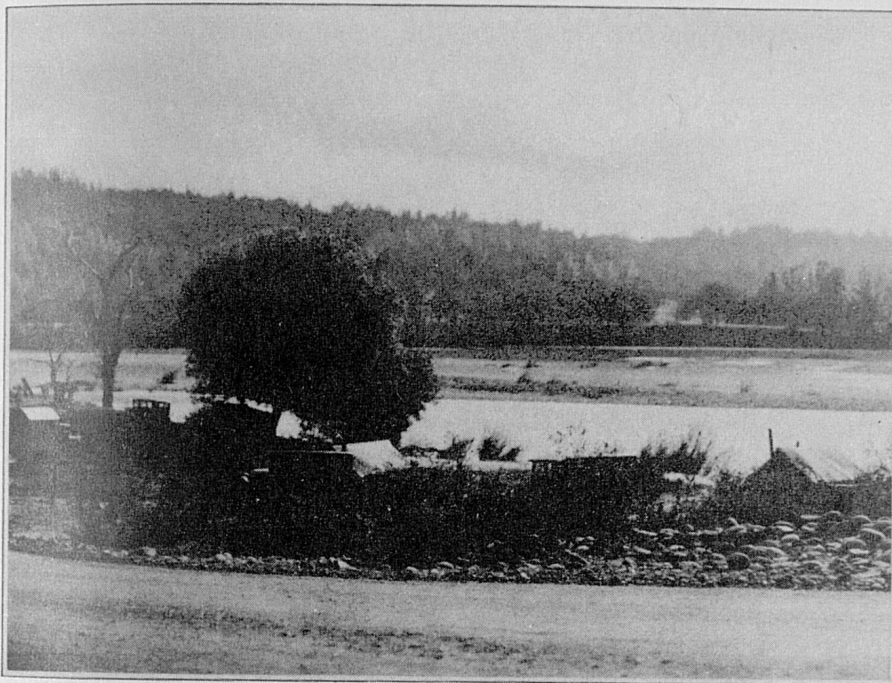


FIGURE 21.— ITINERANT GOLD-MINERS' CAMP ON THE YUBA RIVER,
BETWEEN MARYSVILLE AND GRASS VALLEY, CALIFORNIA

children who lived with him in a tent, and estimated that he made \$2 a day and worked 325 days a year. This miner was an unemployed radio technician but said he preferred outside work because he was afflicted with asthma.

An unemployed mechanic, 37 years old, used a 1-horsepower engine and pump in mining. He worked 10 hours a day, 6 days a week, and estimated his daily earnings at \$2 to \$3 a day. His wife took care of their camp but did not help with mining. This man wanted to return to work for wages whenever he could get a job.

An unemployed millwright, 44 years old, lived with his wife and small child in a cabin on the Yuba River. He said that because of illness he was able to work only 4 hours a day washing gravel. He had a small power outfit and averaged about 75 cents' return for the 4-hour day. A pension of \$42.30 a month provided the main support for this family.

An unemployed acetylene welder, 34 years old, did most of his mining with a home-made dredge. He lived in a village with his wife and son and made the trip to the creeks each day. This miner paid a small royalty on the gold recovered and said he earned a net return of about \$2 for a 7-hour day. When water conditions were unfavorable to operation of the dredge, he mined with a long tom or did odd jobs. He also had been employed for short periods on relief projects.

Appendix

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D. NOTES ON THE PREPARATION OF DATA	138

APPENDIX A

SMALL-SCALE PLACER-MINING METHODS¹

In order to simplify presentation of the principal findings of this study, simple geological and engineering features of great importance in gold placering were noted only briefly in the main body of the report. Understanding of these factors, however, provides a broad background for interpreting portions of the discussion, such as the sections on training and capital requirements in chapter II, on income in chapters III and IV, and on the general life and problems of the placer miner in chapter VII. The following descriptive summary of the character of placer deposits and of the usual methods of recovery by small-scale operators has been prepared for readers who desire a more comprehensive treatment of these aspects than was given in the text.

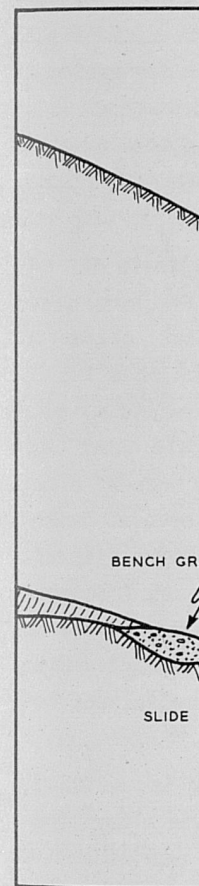
TYPES OF PLACER DEPOSITS

There are two general types of placer deposits - residual and transported or alluvial placers. In both types the original source of the gold was in lodes or veins in solid rock. In both types the gold has been freed from the enclosing rock through weathering agencies, which have caused decomposition of the rock and the partial removal of some of its constituents by solution or by mechanical means. Since gold is unaffected by the usual weathering agencies, it remains in its original form.

In residual placers, the gold and most of the associated decomposed rock are left in their approximate original position or very close thereto. Placers of this type have not been such important sources of gold as have the transported placers, and few, if any, have been worked by small-scale miners using hand methods.

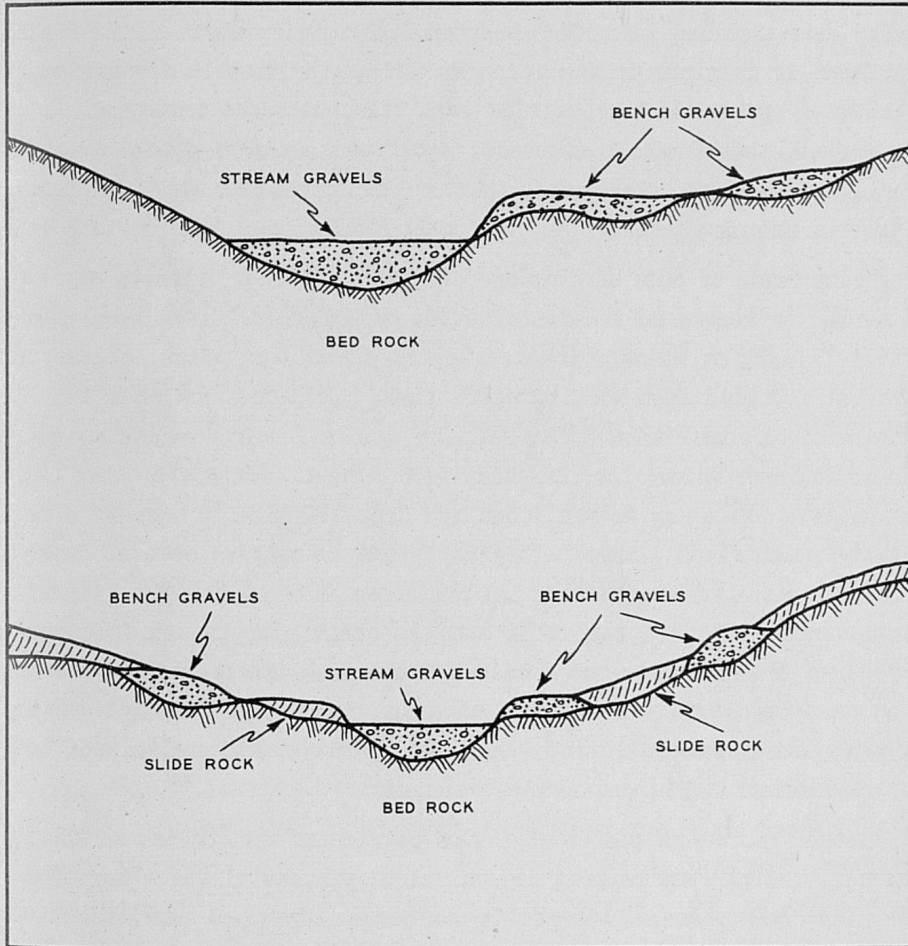
Transported placers result from the removal of gold-bearing rock debris from its original source in the lode by natural agencies, principally running water, and the redeposition of the material some distance therefrom. During transportation the rock is broken and worn away, further liberating the gold. Another important function of running water, without which workable concentrations of placer gold could not occur,

¹This discussion and accompanying illustrations are abstracted mainly from Chas. F. Jackson, *Small-Scale Placer-Mining Methods* (U. S. Dept. Int., Bur. Mines, Inf. Cir. 8611R, mimeo., Feb. 1938), pp. 15-37. Where Mr. Jackson's original discussion has been condensed, new material added, and other sources drawn upon, the responsibility is the writers'.



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Figure A-1.- BENCH AND STREAM PLACERS



is its sorting action, which separates the heavy gold from the lighter material. Briefly, then, weathering and other erosive forces break down the lode material and enclosing rocks; the debris moves down the hillsides toward the stream beds; and the streams carry it along. The lighter, finer material is washed out and carried away, while the heavier material, including the gold and the larger material, is deposited in the stream channels at places where the velocity of the water decreases. The largest and heaviest material will obviously be deposited first (that is, nearest its source in the lode), and the lighter and finer material will be transported farther. Re-sorting of placers may take place because of changes in stream courses or velocities of currents, and the placers may be worked over several times by natural agencies before the gold reaches a final resting place.

Creek placers, with which California abounds, have been the most productive of high-grade gravel. The gold usually is concentrated to a large extent on and just above bedrock. Enriched pockets are likely to be found in crevices in the bedrock, and if the rock is decomposed or fractured, gold will have settled into the cracks and crevices. It is essential, therefore, to excavate to bedrock in every case, and often it is necessary to take up some of the rock to recover the gold accumulated in the crevices.

The presence of beds of clay or "hardpan" in placer deposits may have a marked influence on the distribution of the gold. They form impervious layers, on which concentration of gold takes place, and act to prevent the gold from working below them. This does not mean that no gold will be found below such beds, for gold may have been deposited at lower horizons before the clay beds were formed. Among the other types of placers which may be mentioned are deposits made in ancient stream channels and flood planes. They may stand as much as several hundred feet above the present streams and are known as bench placers. Deposits intermediate between the creek and the bench placers are frequently known as hillside placers. Their bedrock is slightly above the creek bed, and the surface topography shows no indication of bench. Other types, whose names describe them, are river-bar, gravel-plane, sea-beach, ancient-beach, and lake-bed placers.

Another variety of placer worthy of particular mention is the "buried placer," which results from the burial of placers of the other types, usually creek placers, beneath an overburden of gravel and sediment or of flows of lava, after the placer was formed. Such placers have been worked profitably, especially in California, Oregon, and Idaho. Usually they are worked by regular underground-mining methods, the operation being commonly termed "drift mining."

MINERALS ASSOCIATED WITH PLACER GOLD

Placer gold nearly always occurs in association with "black sands." Black sands are composed largely of grains of magnetite (magnetic iron oxide) but may contain varying proportions of hematite (nonmagnetic iron oxide), ilmenite (iron-titanium oxide), marcasite and pyrite (sulphides of iron), monazite (cerium, lanthanum, thorium phosphate), rutile (titanium dioxide), scheelite (calcium tungstate), tourmaline (boron and aluminum silicate), wolframite (iron manganese tungstate), zircon (zirconium silicate), chromite (iron oxide and chromium oxide), and other heavy minerals.

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Although gold has a specific gravity of 19.3 when pure, in its natural state it is usually alloyed with varying amounts of silver. The specific gravity of placer gold ranges from about 15.6 to 19, as a rule. Magnetite has a specific gravity of 5, so that placer gold is 3 to 3.8 times as heavy as magnetite. It is about 2.5 times as heavy as cassiterite (oxide of tin), sometimes found associated with gold, and is 4 to 5 times as heavy as some of the other minerals mentioned above. Lode gold nearly always occurs in quartz and is usually associated with pyrite. Quartz has a specific gravity of 2.6 and is only one-sixth to one-seventh as heavy as gold. During the transportation of placer-forming debris, the quartz grains and grains of other light minerals are therefore carried away, while the gold, black sands, and associated heavy minerals are dropped and sift down between the boulders and larger pebbles, aided by the sorting action of water, until they come to rest on bedrock or on an impervious stratum of hardpan. Likewise, in panning or in other artificial methods of separating and recovering the gold, the black sands and heavier minerals will remain longest with the gold and are the last to be separated therefrom.

With a little experience, gold is readily distinguished from the other minerals, pyrite and biotite mica being most deceptive to the novice. Pyrite is often mistaken for gold by the novice because of its yellow color. Pyrite is very brittle, however, and can be crushed easily. Gold, on the other hand, is malleable, and when pounded it simply flattens out without breaking. Faces of pyrite crystals usually reflect slight changes of color when turned about in the light, whereas gold looks the same from all angles. Sometimes placer gold takes on a rusty appearance because of a film of iron oxide which obscures its true color and character. As the proportion of silver alloyed with the gold changes, the intensity of the gold color will vary until, in electrum (gold alloyed with upward of 18 percent of silver), a pale silvery-yellow color is characteristic. Biotite mica often alters to a bronze color, which may give it the appearance of gold. Mica, however, reflects different shades when it is turned about or viewed from different angles in the light, and if hammered it will break up into thin white flakes. The great difference in weight between gold and mica permits their ready separation by panning, described subsequently.

SIZE OF GOLD PARTICLES

The size of gold particles found in placer deposits varies greatly; it ranges from large nuggets weighing several ounces, or even pounds, to fine flour gold requiring 800,000 to 900,000 colors (gold particles

or grains) to make an ounce, or 260 to 300 colors to 1 cent, with gold valued at \$35.00 per ounce, troy weight. The various sizes of gold particles have been classified by Young,² and his classification is given here to illustrate how fine are the particles for which the miner is searching.

Nuggets

Coarse Gold: That which remains on a 10-mesh screen (10 openings per linear inch).

Medium Gold: That which remains on a 20-mesh screen but passes a 10-mesh screen (average 2,200 colors per ounce).

Fine Gold: That which passes a 20-mesh screen but remains on a 40-mesh screen (average 12,000 colors per ounce).

Very Fine or Flour Gold: That which passes a 40-mesh screen (average 40,000 colors per ounce). These finest particles may run as much as 800,000 to 900,000 per ounce; and it may take 300 colors to make 1 cent.

The statutory price of pure gold was \$20.67 per ounce for about 100 years but was increased in this country in 1933 and is now \$35.00 per ounce. The average value of placer gold, alloyed with varying proportions of silver and other impurities as it is found in its natural state, based on present price, may be taken roughly at about \$30.00 to \$31.00 per ounce; but small-scale miners do not always get the gold clean, and the material they sell may assay only \$28.00 or \$29.00 per ounce. As defined above, medium gold is therefore worth about 1.4 cents per color, and fine gold about one-fourth of a cent per color.

Gold in the coarser sizes is much easier to recover. Fine or flour gold is apt to float off with the light material, either in a free state or tied up in fragments and balls of clay.

PROSPECTING

The first search for placer gold is usually confined to stream beds and their bars and to tributary gulches, since, as previously pointed out, the streams and their tributaries are the principal agencies in the formation of placers. Even though the valuable deposits may be in benches high up on the slopes, their presence almost invariably would be evidenced by showings of gold along the streams below.

In prospecting for gold, the gold pan is an indispensable tool. Figure A-2 shows the ordinary gold pan, which usually is made of sheet

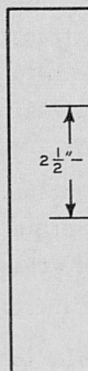
²George J. Young, *Elements of Mining* (3d ed.; New York City: McGraw-Hill Book Co., Inc., 1932), p. 426.

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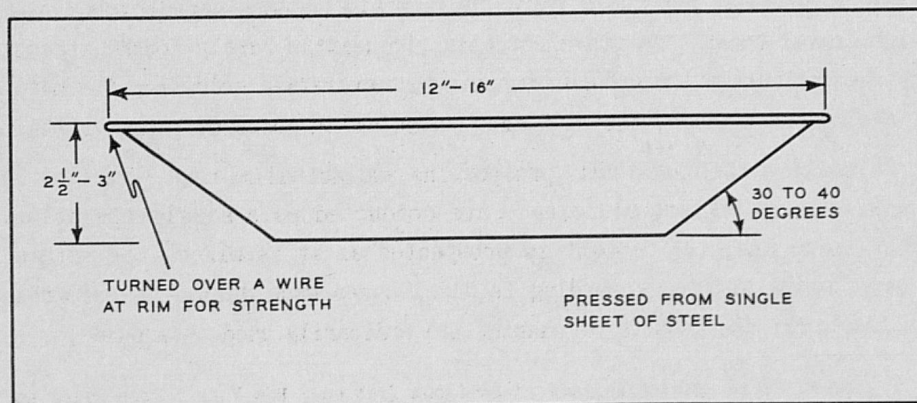
iron. Ordinary iron is the best material to use, since the colors seem to adhere to it better than to surfaces of other materials and since the iron provides a surface upon which the colors are easily visible. Some gold pans have copper bottoms. Both copper and gold amalgamate readily with mercury; and if mercury is rubbed on the copper bottom, much of the fine gold that otherwise might be washed away will be retained by amalgamation with the mercury. The inner surface of the pan should be kept clean, bright, and free from grease.

In prospecting along a stream, the prospector will pan the gravel at various points, selecting particularly those places that show evidence of concentration of heavy minerals by the presence of black sands. Since the gold and heavy sands ordinarily will be found concentrated on bedrock, the prospector will investigate exposures of bedrock in and along the stream, especially crevices therein where these minerals are likely to be caught. In addition, excavations to bedrock will be made in the gravels of the stream bed and its bars and along its banks.

Panning

The material to be tested is dumped into the pan, until it is over two-thirds full. The operation of panning is simple but requires a knack developed only by practice, and one which is difficult to describe clearly with words alone. The pan of material may be held under water at the very beginning of the process and is mixed and kneaded with the hands, breaking up lumps of clay and other easily broken material. If the pan is held in running water, some of the lightest and finest material will wash away immediately. The rocks and pebbles are picked out and discarded, and after all the lumps of soft material have been

Figure A-2.- TYPICAL GOLD PAN



broken up to free any gold trapped in them, the regular panning operation is begun. The pan is raised above the surface of the water and is shaken vigorously from side to side with a slightly circular and dipping motion, which keeps the lighter material in suspension and works it out of the pan. The pan is held tilted slightly away from the operator. The motion of the tilted pan concentrates the gold and heavy minerals around the edge of the bottom. The washing away of the light material is facilitated by alternately raising and lowering the far edge or lip of the pan above and below the surface of the water. Occasionally the pan is lifted entirely from the water and is shaken vigorously with the usual circular motion to concentrate the gold and heavy sands at the bottom and to bring the pebbles and fine, light material to the top. These may then be scraped off the lip with the thumb, thus hastening the operation. The panning is continued until only the gold and heaviest minerals remain. Toward the end of the operation, it may be well to finish panning in a tub of water instead of in the stream, since any gold that may be carried away inadvertently may be recovered later by repanning the contents of the tub. The final product is dried, and black sand is removed with a magnet. Coarse gold can be picketed out, color by color, and fine gold may be recovered by amalgamation with mercury. An experienced man can pan carefully about 100 pans in 10 hours (about 1 each 6 minutes), the exact amount depending upon the skill of the panner, the extent to which the gravel is cemented and whether or not it is clayey, and the size of the gold. From 130 to 160 pans are equivalent to 1 cubic yard of material in place.³ A good panner, therefore, may pan from 0.6 to 0.8 cubic yard per day, depending on the material he is panning (though in exceptional cases a man will sometimes pan 1 cubic yard per day); and to net \$2.50 per day (after allowing for bullion buyers' commissions and other costs), the dirt would have to average about \$4 per cubic yard. This would be considered exceedingly rich gravel today. As gravel of this richness is rarely found, the pan is used primarily for prospecting and for separating gold from the materials concentrated by the equipment described in succeeding paragraphs.

In small-scale hand work, prospecting and actual mining - whether by panning, rocking, or sluicing - are conducted as a single operation. That is to say, the deposit is prospected as it is mined, the working places being shifted according to disclosures made during the progress of the work; the results of panning are ordinarily used as a guide.

³Cf. Robert Peele, *Mining Engineers' Handbook* (1st ed.; New York: John Wiley and Sons, Inc., 1918), vol. 1, p. 755.

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SMALL-SCALE PLACER-MINING METHODS

Small-scale methods may be classified on the basis of equipment employed, as follows:

1. Use of water:
 - a. Panning.
 - b. Rocking.
 - c. Long toms, pump toms, and surf washers.
 - d. Sluicing, including ground sluicing and "booming."
2. Dry-placer mining.

Hand methods are applicable to small-scale operations and, since little capital expenditure is required, are suited to the individual operator or group of operators possessed of only small means. They are applicable in general to deposits of shallow depth that have only a thin covering of barren material.

Panning

The limitations of panning, as regards the amount of material that can be handled and the grade of material that can be treated profitably, have been pointed out already. Panning is slow, laborious work, but, since the only tools required are pick, shovel, and pan, it is sometimes the poor man's only method.

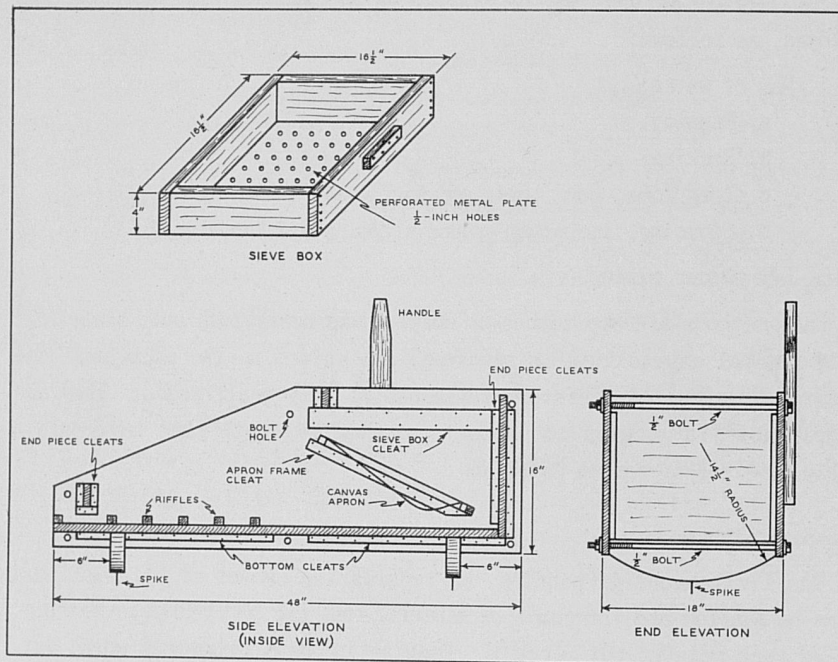
Rocking

Rocking requires little more in the way of equipment than panning and may be employed by the small operator to increase substantially the amount of gravel that can be handled. The rocker may be operated by one man, but preferably by two men; one of them may be excavating and carrying the gravel to the rocker while the other operates the rocker, turn and turn about. The rocker may be used with the pan in prospecting work preliminary to large-scale operation or by the small operator for actual mining operations. Purington⁴ gives the duty of two men, rocking steadily, as 3 to 5 cubic yards per 10-hour day, the amount depending upon the nature of the gravel, the distance it has to be carried, and other factors.

Operation of the Rocker.— In operation the gravel is shoveled into the box. The rocker is then shaken vigorously back and forth with a jerky motion while water is poured over the contents of the box at a rate that will thoroughly break up and remove lumps of clay and wash the gravel

⁴C. W. Purington, *Methods and Costs of Gravel and Placer Mining in Alaska* (U. S. Geol. Survey Bull. 283, 1905).

Figure A-3.- KNOCK-DOWN ROCKER



clean, yet not so rapidly as to carry small gold particles over the riffles. The flow should be regulated so that it will just carry the tailings over the riffles, and it is preferable to keep the flow fairly steady rather than in waves or surges. The water may be dipped up and poured over the contents of the box or conveyed to the rocker in a small stream by a pipe or box. The latter means, when available, obviously will be less laborious. When heavy sands build up and pack behind the riffles to the level of the top of the riffle, gold particles are apt to be washed over and lost. It is necessary, therefore, to keep an eye on the riffles and to see to it that the sand behind them does not pack and that deposits of heavy black sands are not built up. If the rocker is operated along a stream, the question of water supply is obviously simple. If water is scarce or if the placer is some distance from a stream, water for washing must be conserved. For this purpose pits may be dug at the head and at the foot of the rocker and may be connected by a small ditch, the water being used over and over again. Four to six barrels of water per day are ordinarily required for a rocker operated by two men, one of whom can devote his entire time to shoveling gravel.

After the sand and clay have been washed away and the water coming through the screen is clear, the contents of the box - consisting of

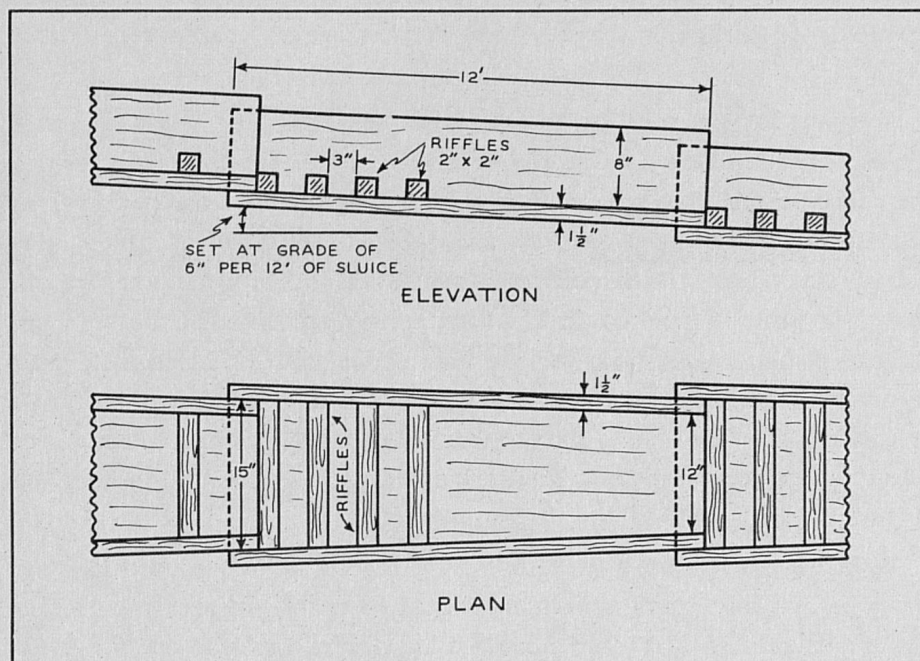
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Figure A-4.- SECTION OF A SLUICE



pebbles too large to pass through the perforations - are examined and picked over for any large nuggets that may be present and are then discarded. The box is refilled and the operation is repeated.

Clean-up.- The canvas apron is removed from the rocker and is rinsed in a tub of water several times a day, and the sands behind the riffles are cleaned out as often as may appear necessary. The concentrates from the apron and from the riffles are cleaned up in a gold pan, as described under "Panning." Mercury sometimes is added to the riffles to catch fine gold.

A rocker is not very efficient and may lose a considerable amount of gold; yet it will handle appreciably more material than will a pan. It is employed for mining small patches of rich placer ground, in connection with exploration work and sampling placer ground, and has been used to some extent in working beach placers. It can be used in regions where the water supply is limited provided the available water is conserved carefully.

Dip Box.- The dip box is used more widely by small-scale placer miners for recovering gold than any other device because it is so cheap and so simple to construct. It is essentially a short sluice, made like a box that is open at one end, and usually is about 5 or 6 feet long, about 10 inches wide, with sides about 6 inches high. There is great variation

in dimensions of dip boxes, largely because they are so frequently constructed out of scrap material. The bottom of the dip box usually is covered with burlap or carpet, over which a heavy, coarse wire screen is laid.

In operation the dip box is set up so that its bottom has a gentle slope; many boxes are constructed with legs of unequal length to provide the proper slope when the boxes are set up on level ground. Gravel is shoveled into the higher end, which is closed, and water is dipped with a large ladle and discharged onto the gravel, sluicing it through the box. The gold is trapped in the wire screen and imbeds itself in the underlying cloth. To clean up, the cleats that hold the screen in place are removed, and the carpet or burlap holding the gold is washed into a gold pan. The final clean-up is effected by panning the gold and black sands thus recovered. When properly operated, the dip box is very effective in saving fine gold.

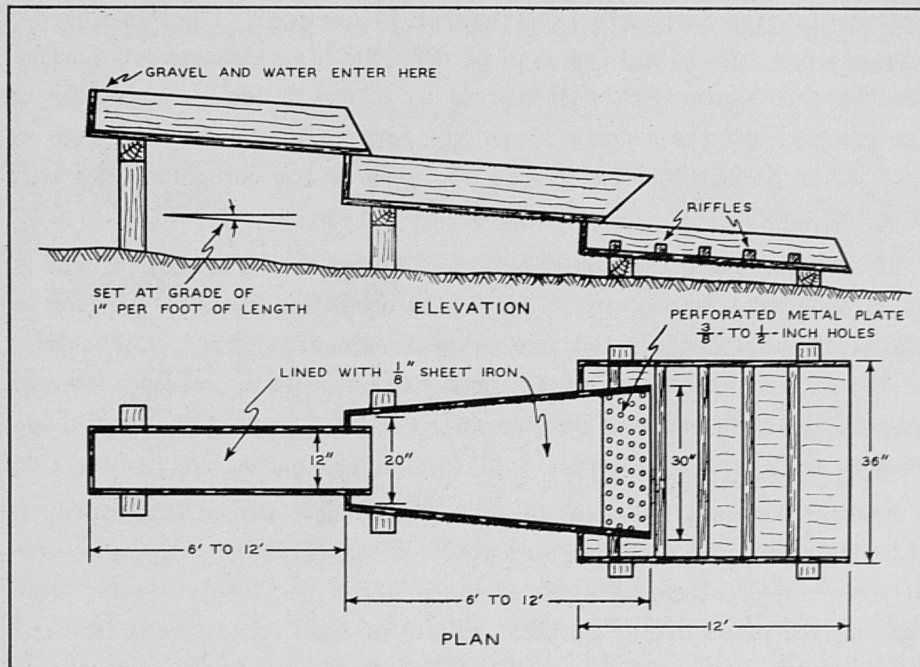
Dip boxes are operated frequently by partners, with one shoveling and the other dipping. Some miners use the dip box for prospecting, finding the larger samples that can be handled in it more satisfactory for evaluating possible working places than the smaller samples that could be handled by panning. Besides its simplicity of design and cheapness of construction, the dip box has the advantage of being moved very easily from place to place.

Long Tom

The long tom is used much more extensively than the rocker in California. It consists of an open box 6 to 12 feet long with a perforated plate or screen at the bottom, into which the gravel and running water are introduced by means of a flume. If water is procured from a pump, the box frequently is termed a pump tom. The material passing through the screen openings, which usually are about half an inch in diameter, drops onto a set of riffles placed in another box. The boxes are set on a slope ranging from about 1:12 to 1:8. The amount of gravel that can be treated per day will vary with its nature, the water supply, and the number of men employed to shovel into the tom and to fork out the large stones. Wilson⁵ states that two men, one shoveling into the tom and the other working on it, can wash 6 cubic yards of ordinary gravel, or 3 to 4 cubic yards of cemented gravel, in 10 hours. At times the tom is operated by four men, two shoveling in, one forking out stones, and one shoveling fine tailings away.

⁵E. B. Wilson, *Hydraulic and Placer Mining* (3d ed.; New York: John Wiley and Sons, Inc., 1918).

Figure A-5.- TYPICAL LONG TOM



Operation of the Long Tom.— The gravel is shoveled into the tom or flume, where the fine material is washed through the screen and the larger rocks are forked out and discarded. The gold and heavy sands which are caught behind the riffles are removed from time to time and are cleaned up in a gold pan. Mercury is sometimes added to the riffle box to catch fine gold. For long-tom operation, a good supply of running water is essential. The drops between the boxes aid in breaking up lumps of clay and help to free any gold particles locked in them.

Surf Washers.— Surf washers are similar to long toms but are wider and shorter. They can be used only when the surf is of proper height. They are set so that the incoming surf rushes up the sluices, washes material from the screen box or hopper, and, on retreating, carries it over the riffles and plates. The average duty per man per 10 hours for long-tom or rocker work on beach operations is 3 to 5 cubic yards. One man can attend to two surf washers, and in one recorded instance 8 cubic yards per 10 hours were handled. This device is used to some extent in Oregon and Alaska, but not very much in California.

Ground Sluicing

In ground sluicing, a stream, or a portion of it, is diverted to flow against or over a bank of placer ground, eroding it and washing it to and

through box sluices. The most favorable conditions for ground sluicing usually are present on the benches and upper reaches of the creeks. Ground sluicing is particularly useful in stripping light overburden from the pay gravel, and deposits of considerable thickness may be handled in this manner if conditions as to volume of water, character of the gravel, and the bedrock slope are favorable. About six times as much water is required for ground sluicing as for doing the same work in a box sluice.

In some instances the stream may be diverted to run against a bank so as to undermine it and cut it away. In other instances, a portion of the stream may be conducted from an upstream point by means of a ditch or flume to the high side of the deposit, where it is released through a cross ditch or series of ditches in order to cut away the material and wash it along to the sluices.

A sluice is simply a series of open boxes, which may be telescoped, in sections usually 12 feet long and provided with riffles. Favorable conditions include a bedrock slope as steep as, or preferably steeper than, the desired grade of the sluices; plenty of room for disposal of tailings; enough water at all times; and a surface and bedrock contour that can be drained so that the shovelers will not be working in water.

Sluices are usually set on a grade of 6 inches to the 12-foot box or sluice section (4.16 percent). Sometimes a long string of tailing boxes without riffles is required for the disposal of fine tailings. In other instances, bedrock grades are not steep enough, and it becomes necessary to elevate the sluices on a trestle to attain the required gradient for sluicing. The maximum practical lift for shoveling into elevated sluices is 6 to 8 feet. The amount of gravel a man can shovel varies widely, depending upon the height of the lift, the amount of picking required to loosen the gravel, difficulty in cleaning bedrock, and the quantity of large boulders to be handled. Only the lighter material is shoveled into the sluices; the rocks and boulders are cleaned off and are thrown aside on bedrock that has been cleaned up. Wimpler⁶ states that in Alaska one man can shovel from $2\frac{1}{2}$ to as much as 10 cubic yards in 10 hours with lifts of 3 to 7 feet; the depth of material shoveled is usually 1 to 5 feet. An average day's work is 7 to 8 cubic yards.

Water is supplied to the head of the sluice by a pipe or flume, and about 1.3 to 3 cubic yards per 24 hours can be handled with a flow of 1 cubic foot of water per minute. This is equivalent to about 3,600 to

⁶Norman L. Wimpler, *Placer Methods and Costs in Alaska* (Bur. Mines Bull. 259, 1927).

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8,300 gallons of water per cubic yard handled. The following tabulation⁷ gives two examples of sluice capacities:

Width of sluice (inches)	Depth of flow (inches)	Grade (percent)	Water flow per minute (cubic feet)	Gravel washed per 24 hours (cubic yards)
10-12	6-7	4.16	45	67.5-135
12-14	10	6.2	100	150 -300

A grizzly or heavy screen box is sometimes placed in the head or upper sluice box, onto which the gravel is shoveled. Thus the coarse material can be eliminated from the sluice at this point.

Clean-up.- Sluices usually are cleaned up at more or less regular intervals. Clear water is first run through the sluice until it has been freed from gravel. Then, beginning at the upper end, the riffles are removed, section by section, while a light stream of water is running into the sluice, washing the lighter material to the sections below. The gold, heavy sands, and amalgam (if mercury has been used) are scraped up and placed in buckets. This material is then cleaned up in the usual manner. Sometimes the heavy sands are treated by amalgamation after the visible gold has been removed, to recover any gold remaining therein.

Variations of Shoveling-in.- Shoveling-in may be done by moving the sluice line to keep it close to the gravel bank and, as the bank is cut away, by moving the sluice over accordingly. In other instances, where this would be expensive and would result in frequent delays while moving or where the slope of bedrock would not permit of this practice, the sluice is constructed in a semipermanent manner and is located centrally with respect to the area to be worked, and the excavated gravel is brought to it by buckets or wheelbarrows. To obtain enough grade for the sluice boxes and at the same time to have storage room for the tailings, it may be necessary to elevate the sluice to a height too great for shoveling-in. In this event it will be necessary to build an incline and to pull the gravel up to the head box. This may be beyond the resources of the small-scale placer miner using hand methods.

Undercurrents, which are a form of sluice but are shallow and are 8 to 10 times as wide as the main sluice, may be employed to recover fine gold that is not caught in the sluice boxes, though small-scale operators using hand methods rarely use this technique. Undercurrents are divided into compartments for convenience in placing riffles and in cleaning up and to allow better control of the distribution of the material.

⁷Young, *op. cit.*, p. 434.

These boxes are paved with wooden blocks, cobbles, or pole riffles shod with iron; the grades required for these riffles are greater than those required for sluice boxes and usually exceed 12 inches per 12-foot box. Sometimes they are covered with carpet, cocoa matting, or burlap to catch fine gold. Undercurrents are placed alongside of and below the main sluice at a point where the latter is elevated enough to give the required drop from the main sluice to the undercurrent. At this point a grizzly or place screen is placed in the bottom of the sluice. The coarser material passes over the screen while the finer material is washed through into a short launder or trough, in which it flows to the head of the undercurrent.

Riffles.— Riffles are constructed in various ways; some of the most common types are illustrated in figure A-5. Pole riffles are popular in hand sluicing because they may be constructed of material usually available nearby for the cutting. The riffles are fitted and wedged in, rather than permanently secured, since it is necessary to remove them for the clean-up. For fine sand and gravel, smaller riffles or carpet, blanket, burlap, or cocoa matting protected by expanded metal are sometimes used on the bottom of the sluices to collect fine gold. Fine material containing fine gold usually requires shallow, wide sluices set on comparatively steep grades. Coarse material requires a narrow, deep sluice. If there is much fine gold, mercury sometimes is used in some sections of the sluice.



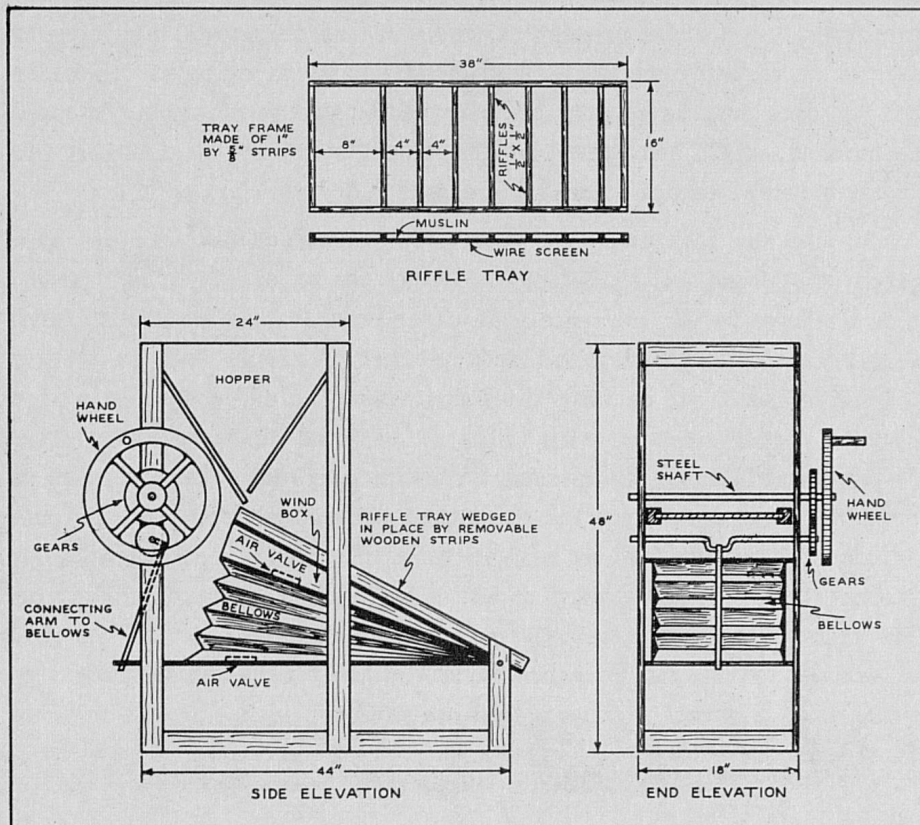
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FIGURE A-6.— DRY WASHER



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Figure A-7.- MEXICAN DRY WASHER

**AMALGAM AND SPONGE**

Quicksilver (mercury) is one of the few readily available materials that react quickly with gold without requiring the use of complicated equipment or dangerous chemical reactions. It is therefore frequently used to capture fine gold which in its powdery state would easily be washed away or otherwise lost. Small amounts of mercury may be rubbed on the bottom of the pan or placed behind riffles in sluices or toms. The amalgam formed when the gold (or gold and silver) dissolves in the mercury is squeezed to remove the excess quicksilver and is then heated to drive off the mercury. The gold left behind is porous and is known as "sponge." In large operations, of course, the reduction of amalgam to sponge is carried out in a covered retort to which is attached a condenser that recovers the mercury for re-use. But most small-scale placer miners are not equipped for this economy. The miners in California are fortunate in that some of the creeks yield enough quicksilver for clean-up purposes. None of it occurs naturally, but the mercury found is metal that was lost in the sluice boxes of former large-scale operators.

DRY PLACERS

Placer deposits are found in some arid regions where ancient streams have dried up or where present streams furnish only small supplies of water at infrequent intervals. A major difficulty experienced in working such deposits in this country has been caused by the moisture contained in the sand, clay, and gravel of the deposits and by the inability to dry the material enough by natural means for dry washing.

Among the machines used, the simplest consists of flat screens supported on a frame and shaken by hand. As the material falls through, it is winnowed by air currents. In other contrivances a hand-operated bellows is added. In some machines a blast of air is used to agitate an inclined table of canvas, which contains riffles, and to help keep the sand partly in suspension while it is moved downward by gravity. The dry material is first passed through screens and then falls on an inclined canvas deck supported on another screen. Sudden puffs or pulsations of air furnished by bellows pass through the deck from below, alternately throwing the sand up and allowing it to settle back again. This allows the light material to work down the table, while the gold is retained by the riffles since it is too heavy to be tossed over them by the air. Figure A-6 shows a hand-operated dry washer in use in White Pine County, Nev.

Table B

Total	
Pacific	
California	
Oregon	
Washington	
Rocky Mts.	
Colorado	
Idaho ^a	
Arizona	
Montana	
New Mexico	
South Dakota	
Nevada ^b	
Utah ^b	
Wyoming	
Southern	

^aData are based on...
^bIncludes the...
^cExceeds the...
^dIncludes Ge...

Table B

Year	No. of
1929	
1930	
1931	
1932	1
1933	1
1934	1
1935	2
1936	1
1937	1

^aExcludes, from...
^bThese figures...
^cThese data...
^dThese data...
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APPENDIX B

STATISTICAL TABLES

Table B-1.- SMALL-SCALE PLACER OPERATIONS IN THE UNITED STATES IN 1935, BY STATE^a

State	Employment		Gold produced		Value of output per miner
	Number of miners	Average number of days worked	Fine ounces	Value	
Total	28,022	45	57,567.26	\$2,014,503	\$72
Pacific Coast States					
California	19,463	40	29,516.95	1,033,093	53
Oregon	3,229	37	4,020.86	140,730	44
Washington ^b	250	89	1,547.60	54,166	217
Rocky Mountain States					
Colorado	1,047	60	4,379.74	153,291	146
Idaho ^b	1,314	85	8,134.07	284,692	217
Arizona	1,184	42	2,492.12	87,224	74
Montana ^b	711	101	4,586.48	160,527	226
New Mexico ^c	233	55	801.17	28,041	120
South Dakota	214	60	491.43	17,200	80
Nevada ^b	130	73	829.00	29,015	223
Utah ^b	41	89	255.80	8,953	218
Wyoming	38	74	142.04	4,971	131
Southern Appalachian States ^d	168	60	360.00	12,600	75

^aData are based on U. S. Mint schedules.

^bIncludes the output of a few miners who worked either for a percentage of the yield or for wages paid by small operator-owners, and the average gross output of gold per man therefore exceeds the average return actually received by the miner.

^cExceeds the average per worker engaged, as the heads of Mexican families usually reported as their own output the gold produced by the efforts of the entire family.

^dIncludes Georgia, Virginia, North Carolina, South Carolina, and Alabama.

Table B-2.- OUTPUT OF SMALL-SCALE PLACER MINERS IN CALIFORNIA, 1929-37

Year	Number of miners ^a	Gold production		Price of gold	Number of sales	Average value of sale	Value of output per miner ^b
		Fine ounces	Value				
1929	43	108.84	\$2,250	\$20.67	101	\$22.28	\$52.33
1930	491	955.41	19,750	20.67	929	21.28	40.22
1931	2,497	6,530.62	135,000	20.67	5,332	25.32	54.06
1932	12,000	23,870.00	493,437	20.67	30,880	15.98	41.12
1933	14,800	17,312.21	442,500	25.56	38,801	11.40	29.90
1934	17,849	23,290.41	837,000	34.95	51,844	16.14	47.42
1935	20,042 ^c	28,261.66 ^c	989,158 ^c	35.00 ^c	56,331 ^c	17.56 ^c	49.35 ^c
	19,463 ^d e	29,516.95 ^d	1,033,093 ^d	35.00 ^d	49,193 ^d	21.00 ^d	53.08 ^d
1936	13,529	22,984.10	804,444	35.00	35,831	22.45	59.46
1937	12,422	15,491.05	542,186	35.00	32,931	16.46	43.65

^aExcludes, insofar as possible, those who owned or leased the properties they worked. The records on this point were probably much less complete before 1931 than for later years.

^bThese figures are considerably higher than the median production figures. For instance, the U. S. Mint median figure for 1935 is about \$20.

^cThese data for 1935 and for the preceding years are based on the reports made to the California State Mineralogist under the High Grade Act (see ftm. d).

^dThese data for 1935 and for the subsequent years are based on the reports submitted to the Bureau of the Mint under the Gold Reserve Act of 1934. Reports to the State Mineralogist in 1935 showed the number of miners as 3 percent higher, gold production as 4 percent lower, number of sales 16 percent higher, calculated average value of sales 16 percent lower, and calculated gross value of production per miner 7 percent lower than reports to the U. S. Mint. These discrepancies are smaller than might be expected for the first year of operation under the Gold Reserve Act.

^eCalifornia reported over 69 percent of the total number of small-scale placer miners who sold gold in the United States (exclusive of Alaska) in 1935.

Table B-3.- NUMBER OF CALENDAR DAYS REPORTED SPENT AT THE CREEKS IN CALIFORNIA AND OREGON, 1935-37^a

Month	California			Oregon ^b		
	1935	1936	1937	1935	1936	1937
Total	794,230	572,372	545,393	118,120	88,500	58,831
January	69,701	55,475	31,831	11,317	8,974	4,734
February	73,165	51,791	39,523	11,170	8,581	5,097
March	77,892	57,308	56,978	11,654	8,999	6,704
April	68,251	53,751	57,458	10,431	8,694	6,089
May	64,871	51,634	52,671	10,828	8,355	5,311
June	59,838	50,291	49,300	9,602	7,836	4,728
July	61,069	47,940	51,920	10,862	7,262	4,247
August	67,208	49,529	48,236	9,486	6,861	4,211
September	61,277	40,498	42,035	7,683	6,725	3,793
October	58,501	41,790	38,384	7,166	6,203	3,936
November	64,286	36,031	38,913	8,194	4,859	4,456
December	68,171	36,336	38,344	9,927	5,151	5,525

^a Figures representing full calendar weeks cannot be secured by dividing these figures by 7, as half the casual miners (or about one-fourth of all miners) worked less than 2 weeks, and may have spent 3 or 4 workdays at a time at the creeks, with no days taken off for rest or recreation. It is estimated that a rough approximation of man-shifts may be secured by multiplying the figures by 75 percent, but the man-shifts will range from 2 to 12 hours.

^b The 1935 figures are complete. The figures for 1936 and 1937 are based on reports from western Oregon, which in 1935 accounted for 83 percent of the total. The 1936 and 1937 figures as given here are therefore 100 times the figures actually reported from western Oregon. There is no reason to believe that the relative importance of the two sections of the State changed appreciably after 1935 and these figures are therefore probably very close approximations.

Table B-4.- SMALL-SCALE PLACER GOLD PRODUCTION IN CALIFORNIA, BY COUNTY AND STREAM, 1935-37^a

	Number of men	Number of calendar days	Value of output (dollars)
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Table B-4.- SMALL-SCALE PLACER GOLD PRODUCTION IN CALIFORNIA, BY COUNTY AND STREAM, 1935-37^a

County and stream	Number of men			Number of calendar days on the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Amador County	331	276	236	14,574	12,449	9,102	48,332	42,071	12,749
Cosumnes River	41	42	24	1,699	1,723	1,137	940	1,478	674
Dry Creek	61	52	44	1,238	2,582	1,478	7,884	9,597	1,344
Indian Creek	18	10	17	1,442	744	679	449	594	492
Jackson Creek	27	13	38	1,317	747	1,976	5,282	1,602	3,569
Pine Grove	6	10	11	218	447	306	528	3,458	547
Plymouth	13	7	11	413	309	338	1,291	336	777
Rancheria Creek	6	6	6	132	368	164	54	252	28
Sutter Creek	19	15	6	897	633	275	4,082	3,698	982
Volcano	10	7	8	343	254	134	3,408	2,640	529
Other districts	128	114	71	6,875	4,642	2,615	19,434	18,216	3,807
Butte County	1,902	1,377	1,403	49,784	43,866	44,279	84,208	80,045	55,059
Butte Creek	249	148	184	4,495	2,770	4,809	11,649	8,172	8,233
Centerville	20	6	10	436	97	119	483	331	128
Cherokee	25	36	31	1,114	3,898	3,505	2,010	1,119	3,716
De Sabla	8	10	11	170	140	288	430	138	626
Dry Creek	10	11	12	326	256	152	581	1,140	614
Fall River	21	15	8	392	382	252	973	527	155
Farnum Creek	29	14	15	689	330	451	1,464	894	316
Feather River	790	554	683	23,699	19,389	21,642	39,843	35,081	25,536
Garden Ranch	9	10	5	153	301	115	273	551	174
Honcut Creek	118	126	107	3,259	3,330	2,845	4,388	5,371	3,295
Inskip Creek	25	20	11	1,606	0	811	1,392	3,039	348

See footnotes at end of table.

Table B-4.- SMALL-SCALE PLACER GOLD PRODUCTION IN CALIFORNIA, BY COUNTY AND STREAM, 1935-37^a - Continued

County and stream	Number of men			Number of calendar days on the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Butte County - Continued									
Lost Creek	21	11	11	725	244	547	2,174	665	1,168
Morris Ravine	26	19	28	808	459	517	631	897	905
Mosquito Creek	6	5	5	199	86	133	457	74	191
Oregon Creek	28	5	7	644	88	216	906	156	383
Sucker Run Creek	9	9	10	365	401	178	260	324	213
Wyandotte Creek	21	8	7	486	133	80	526	106	131
Yankee Hill	19	5	10	604	137	482	546	142	453
Other districts	468	365	268	9,614	11,425	7,137	15,240	21,368	8,474
Calaveras County									
Angels Creek	78	42	34	4,051	2,113	1,435	1,890	3,037	1,173
Calaveras River	126	83	73	5,413	2,152	2,586	4,804	2,600	2,476
Chili Gulch	21	17	16	313	339	336	251	187	293
Comanche	6	13	5	976	538	257	228	847	275
Coyote Creek	68	7	12	3,059	262	373	2,288	78	496
Jesus Maria Creek	15	10	6	665	311	100	573	229	61
Mokelumne Hill	13	29	26	676	1,285	943	377	1,301	1,015
Mokelumne River	14	30	18	1,214	1,341	462	2,722	1,343	1,260
Railroad Flat	9	8	7	510	189	181	407	127	155
San Andreas Creek	12	8	6	1,682	98	424	248	118	55
San Antone Creek	14	7	17	479	82	337	371	81	330
Valley Springs	13	47	7	1,860	573	119	922	1,842	149
West Point	9	8	7	868	412	268	1,276	607	664
Other districts	386	193	212	15,173	8,695	9,768	12,636	9,454	7,237
Del Norte County									
Smith River	66	66	34	1,203	6,535	1,970	1,568	1,593	1,219
Other districts	16	15	10	812	934	611	933	1,607	617

Del Norte County	82	81	44	2,015	7,469	2,581	2,501	3,200	1,836
Smith River	66	66	34	1,203	6,535	1,970	1,568	1,593	1,219
Other districts	16	15	10	812	934	611	933	1,607	617
Eldorado County	1,327	973	686	45,180	29,531	22,324	44,281	40,143	21,739
American River	121	47	20	2,415	1,858	1,194	3,965	4,196	796
Canyon Creek	43	14	12	602	245	723	998	898	1,175
Chili Bar	12	5	8	550	125	239	515	166	46
Coon Hollow	9	10	7	484	179	100	81	83	37
Cosumnes River	38	10	33	1,247	331	1,265	1,088	743	952
Garden Valley	6	10	13	551	267	300	263	300	267
Georgetown	8	21	30	249	550	1,080	267	968	1,068
Greenwood Creek	41	8	21	739	166	311	337	85	342
Hangtown Creek	25	15	14	459	179	130	126	91	61
Indian Creek	16	6	6	439	103	96	314	59	52
Kelsey Creek	12	14	25	190	231	719	249	157	569
Long Canyon	6	8	8	299	419	273	232	337	278
Martinez Creek	26	10	14	643	150	245	598	64	203
Main Fk. Cosumnes River	18	22	8	972	597	113	1,506	682	46
No. Fk. Cosumnes River	22	19	13	762	324	206	627	282	166
Otter Creek	17	15	16	790	913	470	348	561	359
Rescue	8	12	9	122	264	311	147	571	385
Rock Creek	15	11	9	425	266	277	221	461	184
So. Fk. American River	113	87	45	6,980	3,489	2,316	8,267	7,612	3,201
Sweetwater Creek	6	5	8	114	160	187	64	58	154
Webber Creek	210	138	118	6,524	5,118	4,139	4,468	4,513	3,643
White Rock Canyon	22	15	10	654	375	373	530	457	292
Other districts	533	471	239	18,963	13,222	7,257	19,070	16,799	7,463
Fresno County	231	99	43	14,994	13,944	4,611	7,762	2,634	853
San Joaquin River	195	85	33	13,062	13,126	3,361	6,591	2,230	536
Other districts	36	14	15	1,932	618	1,250	1,171	404	317

See footnotes at end of table.

Table B-4.- SMALL-SCALE PLACER GOLD PRODUCTION IN CALIFORNIA, BY COUNTY AND STREAM, 1935-37^a - Continued

County and stream	Number of men			Number of calendar days on the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Imperial County	200	106	75	5,530	2,643	2,222	13,645	3,960	2,534
Mesquite	54	24	15	1,903	798	552	4,159	1,329	704
Pichado	62	47	25	2,107	1,168	851	2,781	1,734	848
Other districts	84	35	35	1,520	677	819	6,705	897	982
Kern County	178	112	98	6,158	4,404	3,995	6,853	6,587	4,542
Black Mountain	32	19	9	1,209	264	230	695	207	197
Goler	60	39	37	2,322	900	1,609	3,172	1,365	2,147
Randsburg	20	12	20	936	499	930	1,132	816	895
Other districts	66	42	32	1,691	2,741	1,226	1,854	4,199	1,303
Los Angeles County	117	42	26	3,910	1,625	1,822	3,312	1,329	973
San Gabriel Canyon	84	24	19	3,017	1,153	1,612	1,728	749	857
Other districts	33	18	7	893	472	210	1,584	580	116
Mariposa County	643	175	423	19,068	5,948	10,358	15,826	7,994	13,319
Bear Creek	44	13	5	898	245	106	534	350	47
Mariposa Creek	43	30	39	2,570	662	1,062	1,091	1,252	1,438
Merced River	31	24	30	2,121	1,756	1,554	1,114	960	2,148
Mount Bullion	16	5	5	222	366	0	323	54	119
Other districts	509	103	344	13,259	2,919	7,636	12,764	5,378	9,567
Merced County	68	36	14	2,967	1,271	474	1,982	1,275	396
Merced Falls	8	11	7	164	34	195	56	172	149
Merced River	41	18	5	2,371	572	240	1,495	418	214
Other districts	19	7	2	432	665	39	431	685	33

Nevada County	3,373	1,896	1,896	85,895	61,645	80,332	155,616	103,651	85,898
Badger Hill	155	10	14	3,769	211	553	8,077	390	779
Bear River	36	66	110	605	2,097	4,237	2,620	15,203	6,423
Bloomfield Diggings	6	14	13	296	531	697	146	483	629
Brush Creek	15	7	5	297	128	44	619	61	28
Canyon Creek	12	7	8	1,423	200	278	251	302	412
Columbia Hill	13	14	10	203	244	422	258	275	495
Deadman's Flat	13	11	12	208	113	0	660	109	641
Deer Creek	436	425	269	173	12,428	12,280	799	15,874	12,551
Footes Crossing	8	7	11	124	183	351	200	141	296
French Corral	12	17	38	156	316	1,318	272	516	1,347
Grass Valley	9	13	14	144	511	1,409	618	818	421
Greenhorn Creek	20	24	39	1,013	1,080	1,933	1,749	1,808	2,442
Logan Canyon	10	13	7	577	997	313	3,778	3,610	797
Main Yuba River	650	32	110	12,437	2,598	4,185	23,091	3,432	4,762
Moore's Flat	31	12	8	771	351	161	1,285	286	354
Nevada City	13	17	15	466	319	1,077	887	400	212
Oregon Creek	116	20	49	2,252	655	1,356	4,251	946	1,910
Poorman's Creek	9	8	9	209	307	281	400	1,615	374
Red Dog	21	35	29	531	905	1,393	530	1,180	809
Rock Creek	9	8	7	176	468	95	261	593	91
Rough & Ready	17	22	6	97	395	0	290	865	73
Shady Creek	46	17	45	702	243	1,222	1,584	716	2,287
So. Fk. Yuba River	440	231	209	15,022	9,681	10,728	24,497	11,389	9,852
Spring Creek	28	11	58	494	329	1,575	996	523	1,887
Squirrel Creek	47	44	29	984	939	887	1,813	2,260	1,657
Steep Hollow	55	47	38	1,406	3,068	2,346	2,847	4,154	2,224
Wolf Creek	65	42	31	1,970	1,010	929	3,823	2,121	2,217
You Bet	146	161	133	4,832	4,065	13,885	5,439	5,214	7,533
Yuba River	211	63	135	5,926	1,727	3,770	8,375	3,823	5,249
Other districts	724	498	435	28,832	15,546	12,607	55,200	24,744	17,146

See footnotes at end of table.

Table B-4.- SMALL-SCALE PLACER GOLD PRODUCTION IN CALIFORNIA, BY COUNTY AND STREAM, 1935-37^a - Continued

County and stream	Number of men			Number of calendar days on the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Placer County	2,615	1,521	1,383	71,884	70,164	55,886	117,785	107,170	60,729
American River	980	315	462	31,140	24,670	22,058	33,015	20,319	23,104
Auburn Ravine	46	51	49	822	1,949	1,578	2,206	2,730	1,815
Bear River	371	253	194	12,014	12,985	11,494	22,612	17,668	8,478
Blue Canyon Creek	13	19	13	521	572	572	823	562	757
Canyon Creek	85	29	7	2,305	930	211	2,069	651	146
Coon Creek	10	10	10	364	417	202	958	76	177
Forest Hill	18	42	42	430	928	891	259	2,364	1,341
Gold Run	5	10	9	71	366	366	153	361	254
Indian Canyon	64	43	62	1,357	1,139	2,117	3,434	3,680	2,566
Iowa Hill	18	34	43	333	1,411	976	1,374	3,285	1,818
Lincoln	8	14	6	96	293	145	278	240	55
Michigan Bluff	27	12	13	2,460	256	247	1,281	568	550
No. Fk. American River	114	79	14	4,379	3,077	271	12,816	13,316	706
Rock Creek	7	21	9	124	657	174	351	221	115
Secret Ravine	23	12	6	169	239	133	448	179	167
Shirtail Canyon	98	67	86	2,661	3,401	2,669	4,172	5,695	3,030
Todds Valley	9	7	9	137	433	485	337	723	505
Volcano Canyon	26	22	18	724	1,050	451	2,019	2,952	725
Other districts	693	481	331	11,577	15,371	10,846	29,182	31,580	14,400
Plumas County	827	716	732	33,131	20,372	23,039	45,195	44,362	38,372
Black Hawk Creek	18	17	16	1,208	497	734	796	622	864
Feather River	87	76	53	2,486	1,858	1,759	3,054	2,586	2,147
Greenhorn Creek	7	5	6	110	156	120	246	131	340

Jamison Creek	50	44	29	2,627	1,760	1,281	2,720	4,215	1,582
Middle Fk. Feather River	108	58	36	4,238	1,260	990	4,279	1,466	938
Mill Creek	7	5	6	166	54	92	166	40	48

Jamison Creek	50	44	29	2,827	1,760	1,281	2,720	4,215	1,582
Middle Fk. Feather River	108	58	36	4,238	1,260	990	4,279	1,466	938
Mill Creek	7	5	6	166	54	92	166	40	48
Nelson Creek	60	60	48	2,496	1,600	1,598	2,703	2,635	1,992
No. Fk. Feather River	73	81	73	4,992	2,438	2,587	11,288	9,238	3,050
Union Valley Creek	13	18	14	263	352	591	166	458	718
Poorman's Creek	14	11	5	306	470	187	441	682	293
Rock Creek	9	8	6	175	172	86	330	144	79
Rush Creek	19	15	18	535	322	469	1,071	1,169	442
Slate Creek	57	57	107	1,879	979	3,697	3,207	2,428	7,578
Soda Creek	14	18	18	745	664	606	673	836	736
Spanish Creek	50	34	30	1,691	756	530	1,685	420	298
Squirrel Creek	18	29	10	903	1,192	257	1,172	2,490	278
Willow Creek	23	16	15	545	337	326	469	838	552
Other districts	200	164	244	7,566	5,505	6,929	10,711	13,944	16,437
Sacramento County	360	285	233	11,573	11,295	9,629	13,588	14,386	8,500
Alder Creek	16	15	18	387	623	530	447	673	323
American River	167	124	97	4,460	5,395	4,640	5,358	6,087	3,485
Carson Creek	11	14	8	338	695	763	501	590	538
Cosumnes River	7	15	14	110	445	708	177	1,756	477
Folsom	12	8	5	472	204	180	490	350	180
Other districts	147	109	91	5,806	3,933	2,808	6,615	4,930	3,497
San Bernardino County	61	61	23	2,302	4,407	1,426	2,958	5,041	906
Coolgardie	15	25	5	750	1,773	554	501	1,820	152
Other districts	46	36	18	1,552	2,634	872	2,457	3,221	754
Shasta County	2,848	1,878	1,702	117,795	75,121	65,771	64,619	49,116	37,513
Bald Hills	18	11	22	590	377	714	268	187	305
Boulder Creek	10	11	14	344	818	418	285	986	615

See footnotes at end of table.

Table B-4.- SMALL-SCALE PLACER GOLD PRODUCTION IN CALIFORNIA, BY COUNTY AND STREAM, 1935-37^a - Continued

County and stream	Number of men			Number of calendar days on the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Shasta County - Continued									
Buckeye Creek	13	15	24	197	382	524	147	478	343
Centerville	10	5	19	344	488	862	285	769	888
Churn Creek	188	48	91	6,691	1,627	3,557	6,006	3,485	1,991
Clear Creek	710	490	394	31,645	19,864	16,139	19,258	14,522	10,004
Cottonwood Creek	78	30	32	2,751	979	923	1,299	764	656
Dog Creek	20	6	9	823	556	593	563	254	303
Dry Creek	63	8	22	2,027	162	664	2,464	113	365
Flat Creek	56	26	58	1,892	787	2,282	863	415	1,235
French Gulch	22	14	12	738	313	347	633	827	144
Hazel Creek	72	39	27	3,276	2,041	1,273	1,749	1,688	944
Horse Town	10	8	5	255	303	244	108	139	64
Jenoselum Creek	61	31	30	2,919	1,330	1,298	1,186	825	888
Knob Gulch	8	25	22	204	1,166	1,008	253	789	577
Middle Creek	93	86	52	3,226	3,110	1,798	954	1,037	554
Olney Creek	79	65	43	2,707	2,474	1,438	790	706	602
Oregon Gulch	10	20	5	272	664	245	152	788	78
Quartz Hill	12	11	6	218	247	90	182	362	42
Redding	11	5	16	6,413	422	327	461	67	345
Rock Creek	55	20	41	1,783	897	1,693	741	466	928
Sacramento River	569	365	330	25,077	17,164	14,835	10,551	7,245	6,415
Salt Creek	40	14	36	1,015	387	1,113	304	250	462
Slate Creek	7	7	10	228	229	347	91	135	105
Sol Pit	5	9	5	159	299	142	84	153	80

Shasta County - Continued									
Spring Creek	78	85	27	2,995	2,834	1,116	974	1,423	391
Squaw Creek	34	6	22	1,729	122	1,158	945	165	285

Shasta County - Continued									
Spring Creek	78	85	27	2,995	2,834	1,116	974	1,423	391
Squaw Creek	34	6	22	1,729	122	1,158	945	165	285
Sulphur Creek	41	14	7	1,298	837	684	748	520	192
Tadpole Creek	37	25	13	1,409	876	513	656	325	333
Whiskey Creek	77	39	32	3,252	1,790	645	1,896	1,003	357
Yankee Gulch	11	7	19	323	419	634	168	369	536
Other districts	348	333	257	10,995	11,207	8,147	9,549	7,883	6,466
Sierra County	1,543	446	424	43,488	14,778	10,166	112,525	19,556	19,225
Alleghany	10	6	5	143	129	251	1,650	290	325
Canyon Creek	40	22	17	668	582	450	1,437	1,087	640
Downieville	13	7	7	626	359	253	841	444	188
Goodyear Creek	8	10	8	356	228	37	534	385	141
Kanaka Creek	290	14	78	13,911	340	2,919	48,063	1,134	7,352
No. Fk. Yuba River	616	61	24	15,208	3,656	468	27,953	2,610	482
Oregon Creek	69	17	15	1,980	342	0	5,419	588	418
Rock Creek	8	6	9	237	31	194	639	140	309
Yuba River	94	150	79	2,013	4,707	0	2,992	4,015	2,119
Other districts	395	153	182	8,346	4,406	5,604	22,997	8,913	7,251
Siskiyou County	1,846	1,755	1,235	62,493	64,144	57,295	73,134	103,674	46,039
Beaver Creek	13	8	15	1,621	329	397	574	175	342
Cherry Creek	5	16	12	0	558	310	59	918	406
Eddy's Gulch	12	22	22	602	654	781	399	897	930
Fort Jones	25	15	10	1,037	697	251	826	1,563	222
Greenhorn Creek	14	9	11	216	938	188	177	200	517
Hawkinsville	13	24	14	1,762	543	0	179	1,507	484
Hornbrook	10	7	18	276	239	0	103	308	254
Horse Creek	9	22	7	482	686	151	149	1,202	158
Humbug Creek	208	155	110	7,085	5,663	3,608	6,948	6,976	3,938
Hungry Creek	6	13	6	355	755	148	163	263	232

See footnotes at end of table.

Table B-4.- SMALL-SCALE PLACER GOLD PRODUCTION IN CALIFORNIA, BY COUNTY AND STREAM, 1935-37^a - Continued

County and stream	Number of men			Number of calendar days on the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Siskiyou County - Continued									
Indian Creek	29	15	20	1,059	787	958	958	1,108	1,376
Klamath River	277	481	424	7,882	18,837	27,412	8,841	20,197	15,817
McAdams Creek	9	6	5	129	223	365	336	521	294
Oro Fino	14	11	19	479	442	1,048	367	1,807	1,094
Salmon River	383	288	170	18,166	14,575	10,047	21,788	19,798	8,482
Sawyers Bar	10	16	59	117	676	1,518	745	5,839	1,722
Scott Bar	60	29	22	1,461	1,200	1,118	2,065	2,838	978
Seiad Valley	15	10	7	116	1,073	137	225	303	220
Shasta River	51	35	16	1,052	546	575	1,280	1,037	544
Yreka	46	31	22	896	1,061	0	890	1,103	360
Other districts	637	542	246	17,720	13,662	8,265	26,062	35,119	7,669
Trinity County									
Big Bar	42	14	21	1,193	313	882	3,701	544	1,468
Brown's Creek	22	33	24	424	656	653	536	690	536
Canyon Creek	62	43	24	1,787	739	414	4,895	2,130	555
Coffee Creek	49	32	48	1,959	1,295	2,071	2,197	1,607	2,082
Douglas City	47	29	27	1,754	1,224	857	2,904	1,126	1,229
Eastman Gulch	5	13	11	157	316	403	120	306	373
East Weaver Creek	21	35	32	405	1,349	970	915	2,251	724
Hayfork Creek	14	24	31	323	337	576	477	995	732
Helena	42	32	20	1,100	963	582	1,945	1,179	913
Indian Creek	26	29	33	549	582	1,152	855	1,510	1,850
Junction City									
Lewiston	15	11	5	368	279	58	318	200	130
New River	59	53	58	1,887	2,134	2,649	1,809	2,238	2,119
New River	24	26	5	500	430	313	1,166	899	463

Junction City	32	49	30	1,013	1,511	920	1,408	2,233	1,266
Lewiston	15	11	5	368	279	58	318	200	130
New River	59	53	58	1,887	2,134	2,649	1,809	2,238	2,119
No. Fk. Trinity River	24	26	5	500	430	313	1,166	899	463
Redding Creek	13	10	5	284	188	151	744	167	62
Rush Creek	22	20	17	774	550	833	418	804	469
Trinity River	299	336	288	12,528	10,143	10,655	20,832	21,317	11,319
Virgin Creek	7	8	11	202	273	442	123	504	281
Weaverville	12	41	56	428	1,331	2,159	693	1,607	2,532
Other districts	390	424	262	13,298	10,026	7,894	17,115	20,409	10,947
Tuolumne County	1,375	1,012	1,063	69,510	42,910	44,379	33,433	26,788	29,910
Big Creek	35	23	9	1,890	1,380	441	1,618	1,135	586
Columbia	29	18	29	3,529	703	780	261	207	450
Curtis Creek	13	9	21	740	126	1,078	141	146	282
Eagle Creek	12	25	6	608	1,211	233	315	800	66
Gold Hill	8	6	6	442	91	483	229	68	48
Groveland	13	8	6	1,227	533	742	306	354	308
Jackass Creek	56	30	72	838	1,577	3,454	1,313	1,063	2,667
Moccasin Creek	66	34	52	2,903	1,316	2,081	1,175	910	3,632
Peoria Flat	8	15	22	602	391	663	133	141	245
Peppermint Creek	7	6	9	229	104	421	112	90	199
Sonora	11	17	20	2,076	1,045	939	988	233	362
Stanislaus Creek	214	155	112	12,641	9,366	5,058	5,817	4,719	4,165
Sullivan Creek	89	47	36	4,777	1,799	2,434	2,065	1,132	611
Table Mountain	20	12	10	908	550	266	265	132	386
Tuolumne River	84	62	70	3,758	2,532	2,859	1,968	1,845	1,638
Turn Back Creek	21	9	11	688	659	351	293	112	145
Woods Creek	213	154	234	10,271	6,642	5,654	5,282	4,597	3,551
Other districts	476	382	336	21,583	12,885	16,462	11,152	9,104	10,551

See footnotes at end of table.

Table B-5.- SMALL-SCALE PLACER GOLD PRODUCTION IN OREGON, BY COUNTY AND STREAM, 1935-37^a

County and stream	Number of men			Number of calendar days at the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Baker County	490	n.a.	n.a.	8,260	n.a.	n.a.	11,873	n.a.	n.a.
Auburn	7	n.a.	n.a.	102	n.a.	n.a.	54	n.a.	n.a.
Baker	8	n.a.	n.a.	326	n.a.	n.a.	139	n.a.	n.a.
Burnt River	78	n.a.	n.a.	2,049	n.a.	n.a.	2,329	n.a.	n.a.
Chicken Creek	5	n.a.	n.a.	183	n.a.	n.a.	104	n.a.	n.a.
Conner Creek	9	n.a.	n.a.	213	n.a.	n.a.	500	n.a.	n.a.
Deer Creek	9	n.a.	n.a.	292	n.a.	n.a.	160	n.a.	n.a.
Eagle Creek	6	n.a.	n.a.	98	n.a.	n.a.	85	n.a.	n.a.
Elk Creek	10	n.a.	n.a.	278	n.a.	n.a.	106	n.a.	n.a.
Flick Bar	12	n.a.	n.a.	427	n.a.	n.a.	809	n.a.	n.a.
Griffin Gulch	8	n.a.	n.a.	102	n.a.	n.a.	30	n.a.	n.a.
Johnson Bar	5	n.a.	n.a.	134	n.a.	n.a.	288	n.a.	n.a.
Pine Creek	10	n.a.	n.a.	417	n.a.	n.a.	235	n.a.	n.a.
Powder River	9	n.a.	n.a.	270	n.a.	n.a.	139	n.a.	n.a.
Quicksilver Gulch	6	n.a.	n.a.	148	n.a.	n.a.	222	n.a.	n.a.
Salmon Creek	6	n.a.	n.a.	121	n.a.	n.a.	173	n.a.	n.a.
Sumpter	11	n.a.	n.a.	653	n.a.	n.a.	170	n.a.	n.a.
Other districts	291	n.a.	n.a.	2,447	n.a.	n.a.	6,330	n.a.	n.a.
Curry County	75	83	37	2,674	2,615	1,573	3,859	4,580	2,148
Sixes River	5	13	8	353	541	225	327	374	210
Other districts	70	70	29	2,321	2,074	1,348	3,532	4,206	1,938
Douglas County	145	98	91	10,684	5,828	248	5,917	6,572	4,123
Cow Creek	50	35	50	4,933	1,414	0	2,828	1,566	2,154
Quines Creek	6	8	5	200	297	248	65	181	100

See footnotes at end of table.

Table B-5.-SMALL-SCALE PLACER GOLD PRODUCTION IN OREGON, BY COUNTY AND STREAM, 1935-37^a - Continued

County and stream	Number of men			Number of calendar days at the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Douglas County - Continued									
Starveout	9	5	6	300	144	0	335	99	350
Other districts	80	50	30	5,251	3,973	0	2,689	4,726	1,519
Grant County	313	n.a.	n.a.	10,335	n.a.	n.a.	8,259	n.a.	n.a.
Bridge Creek	17	n.a.	n.a.	435	n.a.	n.a.	646	n.a.	n.a.
California Gulch	7	n.a.	n.a.	119	n.a.	n.a.	197	n.a.	n.a.
Canyon Creek	28	n.a.	n.a.	512	n.a.	n.a.	573	n.a.	n.a.
Dixie Creek	14	n.a.	n.a.	361	n.a.	n.a.	286	n.a.	n.a.
Granite Creek	14	n.a.	n.a.	323	n.a.	n.a.	131	n.a.	n.a.
Greenhorn	7	n.a.	n.a.	62	n.a.	n.a.	196	n.a.	n.a.
Humboldt	45	n.a.	n.a.	1,379	n.a.	n.a.	1,457	n.a.	n.a.
John Day	6	n.a.	n.a.	236	n.a.	n.a.	109	n.a.	n.a.
John Day No. Fk.	20	n.a.	n.a.	616	n.a.	n.a.	693	n.a.	n.a.
Olive Creek	11	n.a.	n.a.	217	n.a.	n.a.	391	n.a.	n.a.
Ten Cent Creek	5	n.a.	n.a.	50	n.a.	n.a.	109	n.a.	n.a.
Vincent Creek	23	n.a.	n.a.	521	n.a.	n.a.	458	n.a.	n.a.
Other districts	116	n.a.	n.a.	5,504	n.a.	n.a.	3,013	n.a.	n.a.
Malheur County	28	n.a.	n.a.	1,446	n.a.	n.a.	947	n.a.	n.a.
Freezeout Gulch	6	n.a.	n.a.	115	n.a.	n.a.	305	n.a.	n.a.
Shasta Creek	5	n.a.	n.a.	553	n.a.	n.a.	193	n.a.	n.a.
Other districts	17	n.a.	n.a.	778	n.a.	n.a.	449	n.a.	n.a.
Jackson County	1,455	978	570	37,834	28,823	16,518	54,724	43,767	18,612
Applegate River	171	74	43	3,623	2,543	1,483	3,141	2,627	996
Bear Creek	10	8	5	127	151	115	144	54	51

Big Applegate	147	92	56	3,249	1,982	1,818	2,596	1,919	1,340
Brush Creek	16	12	6	380	198	134	416	223	104
Elliott Creek	33	9	10	866	520	335	474	466	428
Evans	32	17	9	773	758	235	1,155	1,101	195
Forest	47	51	32	1,939	2,438	844	1,822	4,374	1,531
Galls	63	71	41	1,421	1,817	991	2,357	2,494	1,076
Gold Hill	32	22	26	1,054	316	455	1,704	947	541
Humbug Creek	13	5	6	425	202	91	452	256	202

Big Applegate	147	92	56	3,249	1,982	1,818	2,596	1,919	1,340
Brush Creek	16	12	6	380	198	134	416	223	104
Elliott Creek	33	9	10	866	520	335	474	466	428
Evans	32	17	9	773	758	235	1,155	1,101	195
Foots	47	51	32	1,939	2,438	844	1,822	4,374	1,531
Forest	63	71	41	1,421	1,817	991	2,357	2,494	1,076
Galls	32	22	26	1,054	316	455	1,704	947	541
Gold Hill	13	5	6	425	202	91	452	256	386
Humbug Creek	16	16	5	800	798	244	622	734	446
Jackson Creek	83	47	33	2,207	1,319	1,148	2,097	2,070	1,319
Jacksonville	179	124	50	5,084	3,310	1,174	17,540	5,681	1,684
Kane Creek	24	12	11	340	273	160	288	207	111
Little Applegate	62	30	10	1,445	614	182	1,552	898	238
Pleasant Creek	26	14	10	854	542	530	1,233	919	530
Poorman's Creek	11	21	9	97	484	254	87	362	397
Ramsey Canyon	10	5	5	272	12	231	163	49	118
Rogue River	106	104	64	3,029	2,794	1,951	4,901	7,146	2,736
Sam's Creek	19	19	6	633	808	266	780	979	76
Sardine Creek	48	30	24	1,405	984	481	2,867	1,778	624
Star Gulch	10	10	8	610	584	462	607	644	382
Sterling Creek	64	49	35	1,233	1,303	776	1,056	1,610	1,109
Willow Creek	25	20	14	806	792	573	840	1,390	465
Other districts	208	116	52	5,162	3,281	1,585	5,830	4,639	1,729
Josephine County	1,039	868	690	43,604	35,540	30,057	52,380	60,101	33,361
Althouse Creek	6	57	49	4,223	2,188	1,704	5,526	4,281	2,128
Applegate River	44	14	17	1,208	405	895	1,997	224	399
Coyote Creek	19	20	10	759	768	440	1,278	1,642	465
Galice Creek	30	44	21	1,152	2,908	1,175	1,157	5,033	1,287
Grave Creek	115	109	98	5,087	3,990	3,401	5,934	8,962	4,252
Illinois River	109	97	61	4,999	4,317	5,439	7,220	5,981	4,793

See footnotes at end of table.

Table B-5.- SMALL-SCALE PLACER GOLD PRODUCTION IN OREGON, BY COUNTY AND STREAM, 1935-37^a - Continued

County and stream	Number of men			Number of calendar days at the creeks ^b			Value of output (dollars)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Josephine County - Continued									
Josephine Creek	46	32	15	1,827	1,309	669	2,240	2,402	891
Jump-Off-Joe Creek	29	27	21	1,161	1,054	1,176	1,559	2,299	978
Miller Creek	7	5	7	218	187	250	247	220	205
Rogue River	235	190	179	7,748	7,239	7,268	8,071	10,143	8,833
Sucker Creek	41	33	19	1,944	1,468	534	2,000	2,427	823
Waldo	21	31	18	1,131	1,355	840	1,539	2,580	599
William's Creek	7	10	10	358	236	303	623	309	547
Wolf Creek	34	8	44	932	754	1,141	1,330	1,336	1,737
Other districts	296	191	121	10,857	7,362	4,802	11,659	12,262	5,424
Miscellaneous	87	863	591	3,283	20,132	13,379	2,771	27,052	13,712
State total	3,632	2,890 ^c	1,979 ^c	118,120	88,500 ^d	58,831 ^d	140,730	142,072 ^e	71,956 ^e

^a Only those streams are recorded where five or more miners worked in each of the 3 years.

^b The number of man-shifts is estimated to be approximately 75 percent of this; see table B-3, ft. a.

^c Data for the western part of Oregon were available for 1935 only, and in that year eastern Oregon represented 78 percent of the number of small-scale placer miners in the State. To compute the State total for 1936 and 1937, the figures for the eastern part of the State were multiplied by 100 or 130 percent. The 22 percent for the western part of Oregon was included under "miscellaneous" for 1936 and 1937 instead of being distributed by counties.

^d Data for the western part of Oregon were available for 1935 only, and in that year eastern Oregon represented 83 percent of the number of calendar days in the State. To compute the State

total for 1936 and 1937, the figures for the eastern part of the State were multiplied by 100 or 120 percent. The 17 percent for the western part of Oregon was included under "miscellaneous" for 1936 and 1937, instead of being distributed by counties.

^e Data for the western part of Oregon were available for 1935 only, and in that year eastern Oregon produced 85 percent of the value of output in the State. To compute the State total for 1936 and 1937, the figures for the eastern part of the State were multiplied by 100 or 118 percent. The 15 percent for the western part of Oregon was included under "miscellaneous" for 1936 and 1937, instead of being distributed by counties.

n.a. Data are not available at the San Francisco Mint.

Table B-5a.- NUMBER OF CREEKS IN OREGON AT WHICH SMALL-SCALE PLACER MINING WAS REPORTED, 1935-37

County	Total			Number included in miscellaneous districts			Number recorded separately		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Total	358 ^a	173	121	286	131	79	72	42	42
Curry	15	10	8	14	9	7	1	1	1

Table B-5a.- NUMBER OF CREEKS IN OREGON AT WHICH SMALL-SCALE PLACER MINING WAS REPORTED, 1935-37

County	Total			Number included in miscellaneous districts			Number recorded separately		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Total	358 ^a	173	121	286	131	79	72	42	42
Curry	15	10	8	14	9	7	1	1	1
Douglas	26	13	12	23	10	9	3	3	3
Jackson	84	67	56	60	43	32	24	24	24
Josephine	110	77	38	96	63	24	14	14	14
Other counties	123	6	7	93	8	7	30	0	0

^aIncludes 110 creeks for eastern Oregon counties for which there were no reports in 1936 and 1937.

GOLD PLACERING BY HAND

Table B-6.- ANNUAL PER-CAPITA PRODUCTION IN CALIFORNIA, BY COUNTY, 1935-37

County	Number of miners ^a			Number of creeks			Value of gold produced			Value of output per miner ^b		
	1935	1936	1937	1935	1936	1937	1935	1936	1937	1935	1936	1937
Amador	331	278	238	44	62	30	\$43,332	\$42,071	\$12,749	\$180	\$174	\$82
Butte	1,902	1,377	1,403	138	128	74	84,206	80,045	55,059	54	66	45
Calaveras	784	502	446	117	89	41	29,093	21,851	15,639	45	50	40
Colusa	n.a.	n.a.	1	n.a.	n.a.	1	n.a.	n.a.	7	n.a.	n.a.	8
Del Norte	62	61	44	12	7	5	2,501	3,200	1,838	38	46	48
Eldorado	1,327	973	886	155	166	74	44,281	40,143	21,739	40	47	37
Fresno	231	99	48	21	11	9	7,782	2,634	853	42	31	21
Glenn	1	2	n.a.	1	2	n.a.	2	73	n.a.	1	42	n.a.
Humboldt	172	29	63	22	15	10	5,383	2,937	2,320	38	116	43
Imperial	200	106	75	16	12	12	13,645	3,990	2,534	83	42	39
Inyo	3	1	5	3	1	1	143	10	185	59	11	43
Kern	178	112	98	28	30	22	6,853	6,587	4,542	48	67	53
Kings	3	1	n.a.	1	1	n.a.	83	6	n.a.	34	7	n.a.
Lake	2	1	n.a.	2	1	n.a.	64	11	n.a.	39	13	n.a.
Lassen	3	n.a.	13	1	n.a.	8	21	n.a.	758	9	n.a.	67
Los Angeles	117	42	28	20	16	7	3,312	1,329	973	34	37	43
Madera	92	52	56	27	21	10	4,398	1,125	1,962	59	25	40
Mariposa	643	175	423	113	52	48	15,826	7,994	13,319	31	53	36
Mendocino	n.a.	n.a.	1	n.a.	n.a.	1	n.a.	n.a.	9	n.a.	n.a.	10
Merced	68	38	14	11	5	4	1,982	1,275	396	35	40	32
Modoc	n.a.	n.a.	1	n.a.	n.a.	1	n.a.	n.a.	11	n.a.	n.a.	13
Mono	16	2	4	5	2	2	781	33	234	59	19	68
Monterey	0	2	n.a.	n.a.	1	n.a.	n.a.	18	n.a.	0	10	n.a.
Napa	1	2	n.a.	1	2	n.a.	7	32	n.a.	9	18	n.a.
Nevada	3,373	1,896	1,896	144	177	106	155,616	103,651	85,898	56	63	52
Placer	2,615	1,521	1,383	214	202	125	117,785	107,170	80,729	55	80	51
Plumas	827	716	732	91	103	105	45,195	44,362	36,372	67	71	60
Riverside	12	6	5	4	4	3	516	1,552	268	53	298	61
Sacramento	360	285	233	35	42	27	13,588	14,386	8,500	46	57	42
San Bernardino	61	61	23	22	14	11	2,958	5,041	906	59	95	45
San Diego	7	4	2	6	3	2	580	749	108	101	214	62
San Joaquin	10	n.a.	17	5	n.a.	11	155	n.a.	268	20	n.a.	18
San Luis Obispo	2	n.a.	n.a.	n.a.	n.a.	n.a.	22	n.a.	n.a.	13	n.a.	n.a.
Santa Cruz	1	n.a.	1	n.a.	n.a.	1	16	n.a.	29	20	n.a.	33
Shasta	2,848	1,878	1,702	135	148	101	64,619	49,116	37,513	28	30	25
Sierra	1,543	446	424	122	94	80	112,525	19,556	19,225	69	50	52
Siskiyou	1,846	1,755	1,235	132	171	96	73,134	103,674	46,039	49	67	43
Solano	1	n.a.	5	1	n.a.	2	5	n.a.	60	6	n.a.	14
Sonoma	6	8	1	6	4	1	317	381	3	65	55	3
Sonora	n.a.	n.a.	11	n.a.	n.a.	9	n.a.	n.a.	219	n.a.	n.a.	23
Stanislaus	33	5	53	5	4	20	1,171	1,647	2,564	43	378	55
Sutter	27	6	n.a.	8	4	n.a.	357	284	n.a.	16	54	n.a.
Tehama	10	n.a.	2	5	n.a.	2	177	n.a.	599	22	n.a.	346
Trinity	1,203	1,262	1,008	142	138	81	63,171	62,716	40,050	65	57	46
Tulare	2	n.a.	n.a.	2	n.a.	n.a.	70	n.a.	n.a.	43	n.a.	n.a.
Tuolumne	1,375	1,012	1,063	140	154	79	33,433	26,758	29,910	29	30	32
Yolo	0	8	19	0	5	3	0	41	551	0	6	39
Yuba	1,352	742	851	69	69	35	76,204	47,996	35,232	68	74	47
All other	103	n.a.	n.a.	n.a.	n.a.	n.a.	7,824	n.a.	n.a.	93	n.a.	n.a.
Total by counties	23,773	15,462 ^c	14,309 ^c	2,026 ^c	1,980 ^c	1,258 ^c	\$1,033,093	\$804,444 ^c	\$542,166 ^c	53	59	44
State total	19,463	13,529	12,422	2,026	1,980	1,258	\$1,033,093	\$804,444	\$542,166	53	59	44

^aThe total of the number of miners listed for each county is greater than the total number for the State, as many miners were reported as working in more than one county.
^bThis figure is adjusted on the basis of the proportion of the total time spent in the State to the time spent on an average in each county. The average output per county for each year is therefore determined by dividing the total number reported as mining in each county into the figure for the total value of gold reported sold by these miners that year, and multiplying the quotient found by the factor 1.125 for 1935, 1.125 for 1936, and 1.125 for 1937.
^cExcludes counties for which data are not available; but apparently no gold was mined in the unreported counties.
 n.a. Data not available.

Table B-7.- IN CALIFORNIA

Length of working year (calendar days)
Total
1- 30
1- 7
8- 14
15- 21
22- 30
31-180
31- 60
61- 90
91-180
181-365
181-270
271-365

^aData on time spent on schedules sent to the State, represented 27 percent of the total time spent at the creeks.

Table B-8.- IN CALIFORNIA

Annual earnings (dollars)
Total
0.01- 10.00
10.01- 20.00
20.01- 30.00
30.01- 50.00
50.01- 70.00
70.01-100.00
100.01-150.00
150.01-200.00
200.01-250.00
250.01-300.00
300.01-400.00
400.01 or over

^aExcludes data reported for less than 0.5 percent.

**Table B-7.- AVERAGE NUMBER OF SMALL-SCALE PLACER MINERS
IN CALIFORNIA AND PERCENT OF TOTAL INTERVIEWED,
BY LENGTH OF WORKING YEAR, 1935-37^a**

Length of working year (calendar days)	Total number of miners	Number inter- viewed	Percentage distribution		Percent miners inter- viewed are of total
			Total miners	Miners inter- viewed	
Total	15,138	183	100.0	100.0	1.21
1- 30	8,114	10	53.6	5.4	0.12
1- 7	2,074	7	13.7	3.8	0.34
8- 14	1,983	0	13.1	0	0
15- 21	1,756	0	11.6	0	0
22- 30	2,301	3	15.2	1.6	0.13
31-180	6,540	60	43.2	32.8	0.92
31- 60	3,754	6	24.8	3.3	0.16
61- 90	1,363	8	9.0	4.4	0.59
91-180	1,423	46	9.4	25.1	3.23
181-365	484	113	3.2	61.8	23.35
181-270	363	60	2.4	32.8	16.53
271-365	121	53	0.8	29.0	43.80

^aData on time spent at the creeks were not reported by all miners on the schedules sent to the U. S. Mint. Those failing to report properly represented 27 percent of the total. Their time distribution was assumed to be the same as that of the 73 percent who reported the length of their stay at the creeks.

**Table B-8.- DISTRIBUTION OF SMALL-SCALE PLACER MINERS
IN CALIFORNIA, BY ANNUAL EARNINGS, 1935-37**

Annual earnings (dollars)	Number			Percent		
	1935 ^a	1936	1937	1935	1936	1937
Total	16,350	13,529	12,422	100	100	100
0.01- 10.00	5,388	4,827	4,451	33	36	36
10.01- 20.00	3,053	2,213	2,263	18	16	18
20.01- 30.00	1,721	1,250	1,178	11	9	10
30.01- 50.00	2,336	1,496	1,422	14	11	12
50.01- 70.00	982	920	787	6	7	6
70.01-100.00	954	734	762	6	5	6
100.01-150.00	775	710	666	5	5	5
150.01-200.00	384	380	398	2	3	3
200.01-250.00	250	235	206	2	2	2
250.01-300.00	147	181	129	1	1	1
300.01-400.00	155	203	109	1	2	1
400.01 or over	205	380	51	1	3	*

^aExcludes data reported by one gold buyer.

*Less than 0.5 percent.

GOLD PLACERING BY HAND

Table B-9.- PERCENTAGE DISTRIBUTION OF SMALL-SCALE PLACER MINERS IN CALIFORNIA, BY EARNINGS PER CALENDAR WEEK AND BY NUMBER OF DAYS WORKED, 1935-37

Earnings per calendar week	Total	Number of days worked per year					
		1-30	31-180	181-365	1-30	31-180	181-365
		Percent of all groups			Percent of each group		
Total	100.0	53.6	43.2	3.20	100.0	100.0	100.0
\$0.01-\$1.75	19.2	7.7	10.7	0.72	14.4	24.8	22.4
1.76- 3.50	16.5	8.3	7.6	0.57	15.6	17.7	17.7
3.51- 5.25	12.8	6.7	5.7	0.49	12.5	13.1	15.4
5.26- 7.00	9.7	5.3	4.0	0.39	9.8	9.3	12.1
7.01- 8.75	7.5	4.4	2.7	0.33	8.2	6.3	10.4
8.76-10.50	5.6	3.2	2.2	0.19	6.0	5.0	6.0
10.51-12.25	4.6	2.8	1.7	0.10	5.2	3.9	3.2
12.26-14.00	3.1	1.8	1.3	0.08	3.3	3.0	2.5
14.01-21.00	9.1	5.7	3.2	0.23	10.6	7.4	7.3
21.01-28.00	3.9	2.6	1.3	0.04	4.8	3.0	1.1
28.01-35.00	2.5	1.6	0.9	0.02	3.0	2.0	0.5
35.01 or over	5.5	3.5	1.9	0.04	6.6	4.5	1.4

Table B-10.- LENGTH OF WORKING DAY OF SMALL-SCALE PLACER MINERS INTERVIEWED

Length of working day (hours)	Number of miners	Percent of total	Length of working day (hours)	Number of miners	Percent of total
Total	185	100	7	20	11
1	1	(a)	8	54	29
2	4	2	9	3	2
3	2	1	10	8	4
4	19	10	11	1	(a)
5	20	11	12	1	(a)
6	52	28			

^aLess than 1 percent.

Table

Length of working week (hours)

Total

2

5

6

10

11

12

15

16

18

20

24

25

30

Table

Length of working year (days)

Total

1- 7

8- 14

15- 21

22- 30

31- 60

61- 90

91-120

121-150

Table B-11.- LENGTH OF WORKING WEEK OF SMALL-SCALE
PLACER MINERS INTERVIEWED

Length of working week (hours)	Number of miners	Percent of total	Length of working week (hours)	Number of miners	Percent of total
Total	177	100	33	3	30
2	1	13	35	11	
5	1		36	20	
6	1		40	20	
10	3	23	42	8	
11	1		45	2	
12	3		48	21	
15	2	10	49	4	
16	1		50	6	
18	1		52	1	
20	9	23	56	11	
24	7		60	5	
25	5		66	2	
30	28				1

Table B-12.- LENGTH OF WORKING YEAR OF SMALL-SCALE
PLACER MINERS INTERVIEWED

Length of working year (days)	Number of miners	Percent of total	Length of working year (days)	Number of miners	Percent of total
Total	183	100	151-180	10	5
1- 7	7	4	181-210	34	19
8- 14	0	0	211-240	2	1
15- 21	0	0	241-270	24	13
22- 30	3	2	271-300	51	28
31- 60	6	3	301-330	1	1
61- 90	8	4	331-365	1	1
91-120	21	11			
121-150	15	8			

GOLD PLACERING BY HAND

Table B-13.- AVERAGE DAILY INCOME OF SMALL-SCALE PLACER MINERS INTERVIEWED

Daily income	Number of miners	Percent of total	Daily income	Number of miners	Percent of total
Total	183	100	1.51- 1.75	1	1
\$0.01-\$0.25	35	19	1.76- 2.00	15	8
0.26- 0.50	45	25	2.01- 2.25	0	0
0.51- 0.75	18	10	2.26- 2.50	6	3
0.76- 1.00	31	17	2.51- 2.75	0	0
1.01- 1.25	4	2	2.76- 3.00	9	5
1.26- 1.50	10	5	Over 3.00	9	5

Table B-14.- ANNUAL INCOME OF SMALL-SCALE PLACER MINERS INTERVIEWED

Annual income	Number of miners	Percent of total	Annual income	Number of miners	Percent of total
Total	183	100	130.01-140.00	1	1
\$ 0.01-\$10.00	13	7	140.01-150.00	10	5
10.01- 20.00	4	2	150.01-160.00	1	1
20.01- 30.00	6	3	160.01-170.00	0	0
30.01- 40.00	3	2	170.01-180.00	3	2
40.01- 50.00	20	11	180.01-190.00	0	0
50.01- 60.00	2	1	190.01-200.00	24	13
60.01- 70.00	0	0	200.01-250.00	13	7
70.01- 80.00	10	5	250.01-300.00	6	3
80.01- 90.00	4	2	300.01-400.00	12	7
90.01-100.00	24	13	400.01-500.00	11	6
100.01-110.00	0	0	500.01-600.00	5	3
110.01-120.00	2	1	Over 600.00	6	3
120.01-130.00	3	2			

Table B-1

Age
Total
16
17
20
22
23
24
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26
28
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30
31
32
33
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35
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37
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39
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41
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50

Table B-15.- AGE OF SMALL-SCALE PLACER MINERS INTERVIEWED

Age	Number of miners	Percent of total	Age	Number of miners	Percent of total	
Total	208	100	51	3	14	
16	1	2	52	5		
17	1		53	7		
20	2		54	5		
22	1		55	10		
23	2		56	9	15	
24	1	57	3			
25	1	58	5			
26	2	59	6			
28	3	60	8			
29	1	5	61	4	9	
30	4		62	1		
31	1		63	4		
32	1		64	6		
33	4		65	3		
34	6	7	66	3	5	
35	2		67	2		
36	3		68	3		
37	1		69	2		
38	1		70	1		
39	2	8	71	1	5	
40	10		72	3		
41	4		73	2		
42	6		74	3		
43	6		75	1		
44	5	13	76	1	1	
45	5		77	1		
46	4		14			
47	3					
48	11					
49	3					
50	9					

APPENDIX C

FORMS FROM WHICH SOURCE DATA WERE SECURED

Form TG-21 AFFIDAVIT ACCOMPANYING DEPOSITS BY PERSONS PURCHASING GOLD DIRECTLY FROM MINERS OR PANNERS.

State of)
County of) ss. (ONLY ONE COPY REQUIRED.)

I, of (Name) (Address) being first duly sworn on oath depose and say that I am the (Title of officer executing affidavit)

of (Name and address of depositor)

the depositor of the gold described below; that to the best of my knowledge, information, and belief, all the facts concerning said gold as set forth in this affidavit are true:

A.- The name and address of the depositor is

B.- The description of the shipment of gold delivered is

C.- The net weight of this shipment in Troy ounces is

D.- The assay or estimated fineness in parts per thousand is

E.- The content of fine gold in Troy ounces is (Estimate if necessary)

F.- The United States Mint or Assay Office to which shipped is DENVER COLO.

G.- The date shipped is, 193....

H.- The names and addresses of the persons from whom the gold was purchased are/is -

1- (Name) (Address)

2- (Name) (Address)

3- (Name) (Address)

I.- The amount and description of each lot purchased is:

1- oz., 193.... (Amount purchased from person named in "H" 1) (Date)

(Description)

2- oz., 193.... (Amount purchased from person named in "H" 2) (Date)

(Description)

3- oz., 193.... (Amount purchased from person named in "H" 3) (Date)

(Description)

Form TG-21

J.- The loca

1-

2-

3-

K.- The peri

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1- From ..

2- From ..

3- From ..

L.- The depo

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I make t Mint or Assa provisions o part of such

(SEAL)

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Make payment

Send (2) M

I hereby

Form TG-21

(#2)

J.- The location of the mine or placer deposit from which each lot was taken is:

- 1-
(As to the lot described in "I" 1)
- 2-
(As to the lot described in "I" 2)
- 3-
(As to the lot described in "I" 3)

K.- The period within which the gold was taken from the mine or placer deposit referred to in item "J" is:

- 1- From, 193..., to, 193...
(As to the lot described in "J" 1)
- 2- From, 193..., to, 193...
(As to the lot described in "J" 2)
- 3- From, 193..., to, 193...
(As to the lot described in "J" 3)

L.- The depositor is the holder of Treasury License TGL- .. bearing Serial No.....

All the said gold was purchased by this depositor directly from the persons who mined or panned gold and no part thereof has been held by this depositor, or to the best of my knowledge, information and belief, by any other person, at any time in non-compliance with the act of March 9th, 1933, any Executive Order or Orders of the Secretary of the Treasury issued thereunder, or in noncompliance with any Regulations prescribed under such Orders or Licenses issued pursuant thereto, or in noncompliance with the Gold Reserve Act of 1934, or any Regulations or Licenses issued thereunder.

I make this affidavit for the purpose of inducing the purchase by a United States Mint or Assay Office of the gold described hereinunder and in accordance with the provisions of the Gold Reserve Act of 1934 and the Regulations issued thereunder. No part of such gold has ever entered into monetary or industrial use.

(SEAL) (Signature)
by

Subscribed and sworn to before me this day of, 193...

(Officer administering oath)

My commission expires:

Superintendent, U. S. Mint, Denver, Colorado.

Make payment for the above deposit to

Send (2) Mint memorandums to.....

I hereby accept Mint scales weight.

Depositor.....

REPORT OF PRODUCTION SOURCE OF BULLION OR ORE

To the STATE MINERALOGIST, State of California
Department of Natural Resources, Division of Mines
Ferry Building, San Francisco

No. 217256

Kind of material sold (bar, grains, amalgam, ore, etc.) _____

Weight _____ ounces. Value \$ _____

From: State or province (if outside California) _____

County _____ Mine _____

Town _____

Name and address of seller, stating whether owner, lessee, superintendent, foreman, or workman on producing mine _____

SIGNATURE OF SELLER _____

Date _____ Address _____

LICENSE No. _____

FORM 505-A. 24074 8-35 40M

ORIGINAL—SEND TO STATE MINERALOGIST

CALIFORNIA STATE PRINTING OFFICE

Form 505-A on which reports are made to the State Mineralogist in the State of California of all gold sold to bullion buyers in the State.

Form for th

1. How ol
 2. Did yo
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 3. Are yo
 4. Where
 5. Were y
 6. If you
 - If not
 7. Do you
 8. Do you
 9. Do you
 10. If int
 11. What i
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 - work?
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 15. How ma
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 16. How mu
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 18. Do you
 - If so,
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 21. Have y
- Write down a

Form for the guidance of interviews with small-scale placer miners.

BUREAU OF MINES - ITINERANT MINERS STUDY

1. How old are you? _____
2. Did you do any placering before 1932? ___ If so, how long have you followed placering? _____
3. Are you a resident of California? _____
4. Where did you reside in 1930? _____
5. Were you employed regularly then? _____
6. If you came to California recently, did you come to mine gold? _____
If not, what was the reason? _____
7. Do you own an automobile? _____
8. Do you live in town or at the mine? _____ Camp out? _____
9. Do you work at placering intermittently or steadily? _____
10. If intermittently, what other work do you do? _____
11. What is your trade, if any? _____
12. What is the chance of returning to your trade or other regular work? _____
13. What method of recovery do you use? _____
14. What kind of power do you use? _____
15. How many hours do you work per day? ___ Per week? ___ How many days per season? _____
16. How much do you make per day? _____ Per season? _____
17. Do you have any dependents? _____ How many? _____
18. Do you have any other source of income besides placering? _____
If so, how much? _____
19. Do you prospect for lode gold as you work? _____
20. What agreements do you make with property owners as to working their gravels? _____
21. Have you been on relief? _____

Write down answers and impressions immediately after each interview.

APPENDIX D

NOTES ON THE PREPARATION OF DATA

CONSTRUCTION OF FIGURE 2

Table B-1 gives the number of small-scale miners finding gold in California in 1935 and the number finding gold in the United States in the same year. California miners represented 69.5 percent of the total shown for the country. Table B-2 gives the total number of miners reported finding gold in California in 1929 through 1937. In drawing the line for the number finding gold in the United States, it was assumed that the ratio that existed for 1935 between the number finding gold in California and the number finding gold in the United States was approximately the ratio that existed during the period 1929-37, and this ratio was used for computing the estimated number finding gold in the United States during this period. The ratio probably varied slightly from time to time but not enough to affect the slope of the curve appreciably.

The figures reported by the State Mineralogist of California for the number finding gold were used through 1934, and the figures taken from the reports to the United States Mint were used from 1935 on. The United States Mint figure was 3 percent less than the figure reported by the Mineralogist in 1935, but this is too small a difference to affect markedly the slope of the curve as drawn. The difference between the two figures for 1936 and 1937, if the reports from the State Mineralogist had been tabulated, would probably have been even less than for 1935. Data from the two sources are so similar that they can be used in the manner indicated without serious incomparability.

The curve for the number seeking gold is an estimate. The 1932 point is based upon statements made to investigators that many of the creeks that were practically abandoned in 1936 and 1937 were crowded with men in 1932 and 1933. Newspaper accounts of the rush to the creeks corroborate these statements. If about 20,000 men found gold in 1936 when the creeks were found to be largely denuded of miners, it is a conservative estimate that 100,000 men were trying to find gold in 1932. The number increased more sharply from 1931 to 1932 than from 1929 to 1931, as the move toward the creeks increased in velocity in 1931. The curve drops slightly from 1932 to 1933 and foreshadows the decrease that took place in 1934. The number estimated to have sought gold in 1937 is based on table B-7 and on the assumption that the number seeking but not finding gold in that year was approximately equal to the number

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abandoning mining after 2 weeks' work which yielded something but not enough to encourage further effort.

Estimates of the number seeking gold must depend largely on the definition of "seeking gold." If half a dozen hunters or men on vacation take a half-day or a day off to try their luck at panning and find no gold, should they be counted as men seeking gold but finding none? If the answer is no, suppose two of the men found some nuggets and sold them to a bullion buyer. They are then included in the number finding gold, and we have the anomalous situation of more men selling gold than sought it. The number who make some slight effort to mine gold is very large, and if only 5 percent of them recover enough to make one sale, their number still might exceed those who mine seriously for 2 weeks or more and recover no metal. Consequently, if none of them are included, the situation cited in the preceding illustration would result; there would be more miners reported finding gold than were reported as seeking it. The method used to compute the estimated number for those seeking gold - by arbitrarily adding to the number reported finding gold the number working up to 2 weeks and finding some gold but not enough to encourage them to continue mining - avoids this difficulty and presents a reasonably close approximation of the situation in 1937.

The curve for the years 1933-37 is drawn freehand. It drops sharply from 1933 to 1934 because that was the period in which the largest decline was reported to have taken place. The slope becomes less each year thereafter until it reaches the point shown for 1937.

This graph was not prepared with the idea that it could exactly illustrate the story, but as an aid to an understanding of the relative significance of the depression gold rush. It gives a very conservative presentation of the movement to the creeks. It shows that by conservative estimate 1 man tried his luck at mining in the United States in the peak years of 1932-33 for every 10 males 21 years of age or over in the State of California in 1930. A more liberal estimate might be that there was 1 would-be miner in California itself for every 10 males 21 years of age or over in that State during the 2 years in which the gold rush reached its peak.

PROCEDURE USED IN COMPUTING TABLE 2

As explained in chapter I, the miners made no effort to distinguish between working and elapsed calendar time in reporting the length of their stay at the creeks. Men who actually mined 15 days out of a month might report that they had spent a month at the creeks, if the first and last days of the 15 were approximately a month apart. And further,

the differences between work and calendar days varied with the different types of miners. The difference was smallest in the reports of the casual miners, and greatest in the reports of the full-time miners.

In order to make the most effective comparison of the skill and the earning power of the various classes of miners, it was necessary to translate the annual recovery data into figures for time intervals that would be constant for all miners. At the same time it was desirable to discover what those miners who worked steadily, and for what would be considered a fair amount of time each week, recovered each week as compared with the average run of miners. It appeared that both of these aims could be achieved if annual output was translated into output for each full workweek, which on the creeks, as explained in chapter VI, may be taken as 5 days. Table 2, therefore, gives the distribution on the basis of gold recovery for each 5 *work* days; it thus makes it possible to compare the output per given unit of time for each of the three classes of miners and also to see what the men recovered who worked steadily through each week and what the others might expect to recover if they worked steadily - unless, of course, they were physically handicapped or worked only at the most favorable times.

As the standard workweek is taken as 5 workdays, the output per calendar week and per workweek (per actual and per full-time week) would be identical for miners who put in 5 workdays out of each 7 calendar days. The figure for their weekly recoveries would be obtained by dividing the total by the number of calendar days reported spent at the creeks, and multiplying the result by 7. For instance, if a man spent 14 days at the creeks, worked 10 days, and found gold worth \$35, his weekly recovery was \$17.50 [$(\$35 \div 14)7$]. The figure for his per-diem output would be obtained by dividing the weekly figure by 5, and in this case would be \$3.50.

The figures on a workweek basis for miners who work either more or less than 5 days per week will, of course, not be identical with those on a calendar-week basis. A miner, for instance, may recover gold worth \$42 in 14 days at the creeks by working each of the 14 days. His output on a per-diem basis would be only \$3, and in a standard workweek he would recover \$15 as compared with \$17.50 for the miner cited in the first illustration, though he found gold worth \$21 on an average each calendar week.

The utility of both workweek and calendar-week figures is shown by the two examples given. The workweek figures show that day for day the first miner recovers more gold; the calendar figures, that week for week the second miner has the larger income. They show also that if

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the second miner begins to get tired after a few weeks and adjusts his workweek to the customary length, his output may drop below that of the first miner.

In computing the data presented in table 2, it was estimated that the average workweek of the casual miners was 112 percent of the standard 5-day week. This estimate was based on an analysis of the number reporting as working 1 week or less, 2 weeks or less, etc., and on the assumption that the number reporting as working 2 weeks or less worked as many days as they reported spending at the creeks, and longer hours than average, while the rest worked the standard workweek. This is not exact, since some working less than 2 weeks did not spend each day in their interval in mining at the creeks, but, on the other hand, many who reported working over 2 weeks worked several stretches of but 3 or 4 days at a time, and their workweek was more than five-sevenths of the number of calendar days they reported as spending at the creeks. These two factors are believed to have been compensatory, leaving the relationship between working time and elapsed time for the casual miners approximately the 112 percent indicated.

The ratios used in calculating recoveries on a calendar and workweek basis for intermittent and full-time miners varied with each income group but can easily be determined by comparing the figures for these groups in tables 1 and 2. The ratios used were empirical; they were based on first-hand observation and on close examination of the earnings reports on a calendar basis of all intermittent and full-time miners. Twenty-four percent of the intermittent miners, for instance, reported that they recovered over \$10.50 per calendar week. Most of these 24 percent worked not over 2 months, at the most favorable times only, and worked more than 5 days out of each 7 calendar days they reported spending at the creeks. It would be expected that their recoveries on a workweek basis would be less than on a calendar-week basis, and the percentage in the over-\$10.50 group would drop. On the other hand, many of those recovering from \$0.51 to \$10.50 worked less than 5 days a week. It was assumed that the shifts between these two groups roughly balanced, and the proportion recovering over \$10.50 was left unchanged. A very large proportion of those in the group recovering less than \$3.50 per calendar week spent a good deal of their reported time away from the creeks, working for farmers, cutting wood, or doing odd jobs in the towns and cities. It was assumed that after allowance was made for this time spent away from the creeks, only 25 percent of the intermittent miners had an output of not over \$3.50 per 5-day workweek. That left 51 percent of them in the \$3.51-\$10.50 group.

A similar method was used in computing recoveries on a workweek basis for the full-time miners. It was estimated, from the information obtained by the interviews, that approximately 25 percent of these miners have pensions or other outside incomes and do not put in a full workweek, and that some of the others do part-time work away from the creeks during some part of the year at least. After allowing for these factors, it was estimated that about 15 percent of the full-time operators recovered not over \$3.50 per 5-day workweek as compared with the 40 percent in this classification on the calendar-week basis. Those with an output of over \$10.50 per calendar week included a few who were working long hours; so in translating the figures to a standard workweek basis, the percentage was cut from the 16 reported on a calendar-week basis to 15 per 5-day week.

These computations had to be made for the State as a whole and not with any particular locality in mind, and if any reader feels that the corrections made in any instance are not suitable for the communities with which he is acquainted, he can compute his own distribution for earnings on a workweek basis by using table 1 as a base and by substituting the ratios his judgment suggests as better adapted to a particular area.



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- E-2 Small-Sca
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- E-4 Employmen
- E-7 Technolog
- E-8 Changes 1
- E-9 Mechaniza
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- A-4 Pota
- A-5 Corn
- A-7 Cott
- A-10 Whea
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- A-6 Trends in
- A-8 Trends in

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- P-3 Employmen
- P-4 Ten Years
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- L-3 Employmen
- L-4 Selective
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