LAND UTILIZATION IN AMERICAN SAMOA

BY

JOHN WESLEY COULTER

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[1]
Land Utilization in American Samoa

By JOHN WESLEY COULTER

ASSOCIATE PROFESSOR OF GEOGRAPHY, UNIVERSITY OF HAWAII

INTRODUCTION

This paper is the result of field work in American Samoa during the period from July 3 to October 23, 1935. I lived for a month with a Samoan Chief on the island of Tau and for a week with other Samoans in their homes in western and eastern Tutuila. The rest of the field study was carried on from American homes at the Naval Station and at Feleti School.

I was aided in my investigations by Captain M. Mine, United States Navy, Governor of American Samoa, and Mr. Frank Drees, Superintendent of Schools, at the Naval Station on Tutuila; Dr. G. Gordon Brown, Mrs. Brown, and Maunuga at Feleti School; Mr. Ned Ripley (Leemo) and the Marist brothers, Fred Henry and Herman, in Leone; Chief Tufele and Mr. Wray Harris on Tau. Thanks are due to other Navy officers for transportation and courtesies in general. To the late Mr. Alfred C. Elkington of Honolulu, a friend of American Samoa, I am indebted for financing the field work.

As an explication of my methods of presenting this paper, I quote from an impartial observer commenting on Anthropology in Action (Brown and Hutt, 4) :

... are we not overlooking the undeniable fact that tribal culture, so ably studied by the Anthropologist in its momentary stage and in its dynamic changes, is inseparably tied up with physical environment which itself is likewise subject to a constant flux and consequently, to dynamic change? To study this environment, its influence on man, its reactions to the activities of man, its short, 10 Great man as an integrating factor of the Earth’s surface, is the high and admittedly difficult task that modern Geography, that synthesis of all physical and biological sciences, has set itself. Is it, therefore, not essential that the experimenting Dute of the Administrator and the Anthropologist should be transposed into a Trio in which the Geographer would play an equally important part?

AMERICAN SAMOA

The Samoan islands extend from latitude 13° 26’ south to 14° 32’ south and from longitude 168° 10’ west to 172° 46’ west. American Samoa comprises the island of Tutuila and all other Samoan islands east of longitude 17° west of Greenwich (map, fig. 1); they extend from 14° 10’ south to 14° 32’ south. From west to east they are Tutuila, Aunu, Ofo, Olosega, Tau and Rose Island. Aunu is part of Saole county of Tutuila; Ofo, Olosega, and Tau are called the Massa group.

1 Numbers in parentheses refer to REFERENCES, p. 41.
CESSION TO THE UNITED STATES

On February 19, 1900, the largest of the islands now known as American Samoa was, by executive order of President McKinley, placed under control of the Department of the Navy for a coaling station, and, by general order of the Secretary of the Navy, established into a naval station, called Tutuila, under a Commandant. The Manua Islands were ceded by their chiefs to the United States on July 14, 1904, four years after the cession of the island of Tutuila. The chiefs of Manua would not voluntarily give up the control of their islands until they felt sure they would not lose their lands.

In 1929 the Congress of the United States passed a resolution accepting, ratifying, and confirming the cession of the islands to the United States as voluntarily made by the high chiefs in 1900 and 1904.
The sovereignty of the United States was extended to Swains Island, which was made part of American Samoa by a joint resolution of Congress, approved March 4, 1921. Swains Island is in latitude 11° 04' south and longitude 171° 06' west.

GOVERNMENT

The following writers treat, in some detail, the government of American Samoa: Ryden (41) discusses how American Samoa was acquired by the United States. Keeling (23) gives a good picture of British and American Samoa.

The government of American Samoa is in practice by indirect rule, a type of government which has been successful in dealing with native peoples elsewhere. (See 4, pp. 10-11.) It is in line with the most recent developments in native administrations. The administrative body uses in part the native political structure to carry out the routine of government. It takes natives with high titles and gives them governmental responsibility and salary. It recognizes village, county, and district gatherings for discussion—the traditional way of Samoan native government.

American Samoa is divided into three administrative districts each with a native district governor appointed by the Governor of American Samoa. The districts are divided into counties and the native chiefs of these subdivisions are also appointed by the Governor. Unless there is good personal reason against it, the highest chief in the county is appointed County Chief. Village chiefs are elected annually by village councils composed of family heads, but the chiefs selected must be approved by the Governor.

The attitude of governments toward the Polynesians under their influence has remained essentially an economic one, and that of American Samoa is no exception. To make the best commercial use of land is uppermost in the mind of an American farmer and this is reflected in the attitude of the government of the United States toward agricultural production. However, there is grave doubt as to whether the economic system of Western civilization can be imposed on a native people with advantage to them.

The relationship between the governing power and governed native people has been made the subject of a detailed investigation by a study group of the Royal Institute of International Affairs (37). The following passage quoted from the introduction is pertinent to the situation in American Samoa:

There has been a change since the war [the World War] in the view which governments take of their responsibilities toward subject peoples. Anthropological studies of the effects of the impact of Western civilization on more primitive ways of living have aroused serious anxiety among those interested in Colonial administration.

It has been realized that negative action, such as the prohibition of import of spirits and narcotics drugs, and the prevention of manifestly anti-social practices, is not enough; that the peoples whose ancient sanctions for the control of life are being broken down...
the new order of government and the introduction of organized production must have something positive to put in their place, and that the framework of native society may, with advantage, be actively supported, so that development towards a new way of life may be a natural, rather than an artificial growth.

The danger of any sudden grafting of Western ideas on primitive civilizations is increasingly realized. The new policy, however, demands knowledge, tact and forbearance, and is not applicable when the governing power desires to exploit the riches of the Colony as quickly as possible. . . . The Colonial Powers . . . must prove to peoples in the Colonies that the protection and the administration they offer is a fair return for the taxation and the other obligations they impose and is directed to insure local prosperity. . . . Perhaps they must go even further, and to organize their administration, and in particular their educational policy, that it is directed not to permanent domination, but to the building up of a system which will eventually enable Colonial peoples to achieve independence.

The majority of the people of the west who elect governments to formulate new laws are inspired with commercial motives, but there is no indication that American Samoa possesses economic potentials.

The government of American Samoa operates smoothly in spite of the short term of office of the administrators (the term of naval duty is 18 months) because the higher officers in the Navy have had much experience in the governing of people and are friendly with Samoan officials, occasionally inviting them to their homes.

Cumulative difficulties, however, are becoming more and more troublesome to the government. For example, members of the native guard (Pitāfita) who have served full terms, retire with pensions through which they are able to exert more influence in their families than the family chiefs. They refuse to take their old place of subjection to the family head (matia), and there is increasing trouble between retired guards and chiefs of the old Samoan organization. The Attorney General is so taken up with matters of this kind that he has almost no time to devote to the copra business which also lies in his province of administration.

When chiefs (matia) who are members of the guard retire, they utilize their training and administer their family groups. Some of them have titles of high chiefs.

The Public Works Department, which makes new roads, reservoirs, and other improvements for the benefit of the natives is supported in large part by the Navy, though part of the money for this department is obtained by local taxation.

In similar administrations, the problem of revenue is of outstanding importance. But the government of American Samoa subsidizes the natives in that the salaries of the local guards help to support large Samoan families (fifita). Nearly one percent of the population draws a salary in this group, and that one percent helps to support 20 percent of the people. Some families on Tutuila, headed by incompetent chiefs, plant scarcely enough taro and bananas; part of the time they live off friends who habitually have enough.
A native inspector of plantations is appointed by the government to visit each village in his area in turn. I was in one village when he arrived. He called the family chiefs of the village together and asked how much each had planted of coconuts, bananas, taro, and other crops. Each answered the amount which he supposed the government expected him to plant. Inspectors of plantations are valuable, however, and one very efficient native inspector has proved the heath of families in his district to raising more crops.

The following quotation shows the government's concern in the matter of trying to get the natives to increase the productivity of their land. It is from the Annual Report of the Governor to the Secretary of the Navy in 1935 (12).

With the rapid increase in population on a very limited area of arable land development of local agriculture is essential if the people are to continue to increase and remain self-supporting. The people must be educated and trained to improve the productivity of the very limited arable lands and grow better and more varied foods. Samoans do not take a great interest in the Department of Agriculture, generally being indifferent to its aims and displaying a general apathy towards the entire agricultural program.

Though it is essential that Samoans realize a measure of independence in using enough land to feed themselves, the Samoan environment and economic scale of living do not allow production on a scale comparable to that in North America. It takes 14 hours of skilled labor to make a piece of tapa which the natives sell locally for 50 cents. It takes three hours to make a square foot of floor mat which they sell for five cents. It is difficult to estimate the labor involved in producing 100 pounds of copra, which in 1937 had a market price of $2.50. It involves the collection, husking, and cutting of approximately 273 coconuts, drying the meat and transporting it to Pago Pago. Two and three fourths nuts make one pound of dried copra.

Paffenbeger's statement (40) is pertinent:

It is my purpose rather to urge that we take an objective attitude toward ourselves, and look with humility upon the beliefs and attitudes which we cherish with such vehemence. Having achieved this end, we can react with sympathy and understanding toward the minds of others whose differing racial background, national history, social status of economic security give them an equally different outlook on life.

The dependency of Samoans on the Government is a factor in their lack of interest in expanding their plantations to take care of the growing population. More concern would be placed by the people if they saw any need for them. They take the attitude that if the Government is so anxious to improve the present methods of land utilization and introduce new crops, it will benefit, and therefore it should do the work. They, on their part, have lived (for hundreds of years under their present system of doing things and see no necessity for change.

The following table shows the costs of government for a year in American Samoa, for which money is raised from local taxation:
### Table 1. Budget of American Samoa for 1936

<table>
<thead>
<tr>
<th>Item</th>
<th>Expenses</th>
<th>Percent</th>
<th>Receipts</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>judicial</td>
<td>$3,717.09</td>
<td>6.25</td>
<td>$2,484.80</td>
<td>2.45</td>
</tr>
<tr>
<td>native tax</td>
<td>12,546.00</td>
<td>13.15</td>
<td>39,927.26</td>
<td>39.36</td>
</tr>
<tr>
<td>public health</td>
<td>13,949.45</td>
<td>13.66</td>
<td>1,288.72</td>
<td>1.27</td>
</tr>
<tr>
<td>customs</td>
<td>3,903.01</td>
<td>3.56</td>
<td>30,695.24</td>
<td>30.76</td>
</tr>
<tr>
<td>education</td>
<td>26,903.53</td>
<td>23.41</td>
<td>651.17</td>
<td>0.64</td>
</tr>
<tr>
<td>public works</td>
<td>15,356.10</td>
<td>14.40</td>
<td>463.04</td>
<td>0.43</td>
</tr>
<tr>
<td>communications</td>
<td>325.00</td>
<td>0.03</td>
<td></td>
<td>0.00</td>
</tr>
<tr>
<td>printing</td>
<td>2,572.89</td>
<td>2.29</td>
<td>599.88</td>
<td>0.60</td>
</tr>
<tr>
<td>transportation</td>
<td>9,427.81</td>
<td>8.61</td>
<td>17,832.93</td>
<td>17.54</td>
</tr>
<tr>
<td>treasurer</td>
<td>1,035.00</td>
<td>0.91</td>
<td>11,782.93</td>
<td>11.54</td>
</tr>
<tr>
<td>cargo and copeys</td>
<td>9,090.27</td>
<td>8.13</td>
<td>8,080.65</td>
<td>7.84</td>
</tr>
<tr>
<td>agriculture</td>
<td>906.51</td>
<td>0.84</td>
<td></td>
<td>0.08</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$94,474.38</strong></td>
<td>100.00</td>
<td><strong>$101,820.69</strong></td>
<td>100.00</td>
</tr>
</tbody>
</table>

a. is the budget raised locally and does not include salaries of the government officials which are paid by the F.S. b. does not include salaries of the officials. c. does not include salaries of the officials. d. does not include salaries of the officials. e. does not include salaries of the officials. f. does not include salaries of the officials. g. does not include salaries of the officials. h. does not include salaries of the officials. i. does not include salaries of the officials. j. does not include salaries of the officials. k. does not include salaries of the officials. l. does not include salaries of the officials. m. does not include salaries of the officials.

The cost of government in American Samoa will continue to increase with growing population. There is no apparent source in Samoa for the additional revenue necessary, even should the price of copra remain the same, a supposition which is not warranted in view of the price fluctuations of past years.

Just how much pressure can be brought to bear on the natives to make them produce more copra and artifacts to pay for the western things introduced cannot be stated. Just how much different the thinking of native people is from that of Western people is difficult to measure. Boss would lead us to believe that the human organism is capable of adaptation to a very high degree (2). Conclon (10) would have it that biology is a much more important factor than many people believe. Murray has the following statement to make regarding native administration in Papua (36):

> The science of native administration—of there be such a thing—is far from being an exact science, if only for the reason that its subject matter differs so much in different parts of the world, and that an administration which is a failure in one country might be a great success in another. Consequently any attempt to treat it as anything like an exact science is doomed to failure. The principles of justice and humanity are of course applicable to all human relations, but any attempt to convert them into rules of administrative practice, and still more any attempt to dogmatize about details of native government, and to draw inferences from other parts of the world, should be watched with the greatest care.

#### NATURAL ENVIRONMENT

**CLIMATE**

The climate of Samoa is one of high temperature and heavy rainfall; the daily range of temperature is small and there is little variation from day to day.
The average monthly temperature at the Naval Station, Tutuila, for the period of 37 years, 1900 to 1936, is as follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>Average Temperature (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>61.79</td>
</tr>
<tr>
<td>Feb.</td>
<td>62.28</td>
</tr>
<tr>
<td>Mar.</td>
<td>62.74</td>
</tr>
<tr>
<td>Apr.</td>
<td>64.17</td>
</tr>
<tr>
<td>May</td>
<td>64.94</td>
</tr>
<tr>
<td>June</td>
<td>65.48</td>
</tr>
<tr>
<td>July</td>
<td>82.31</td>
</tr>
<tr>
<td>Aug.</td>
<td>81.64</td>
</tr>
<tr>
<td>Sept.</td>
<td>80.82</td>
</tr>
<tr>
<td>Oct.</td>
<td>80.66</td>
</tr>
<tr>
<td>Nov.</td>
<td>80.44</td>
</tr>
<tr>
<td>Dec.</td>
<td>81.23</td>
</tr>
</tbody>
</table>

The temperature is higher from December to May than from June to November. February is the hottest month with an average of 82.28°F; July is the least hot with an average of 80.21°F. The log of the United States Ship Ontario inPago Pago Harbor, Tutuila, frequently records midday temperatures of 90 to 95 degrees.

**Figure 2**—Average monthly rainfall and temperature at the United States Naval Station, Tutuila, 1900-1936.
RAINFALL

The average annual rainfall at the United States Naval Station on Tutuila for the years 1900 to 1930 inclusive was 196 inches. The year may be divided into a wet season, November to March, and a less wet season, April to October. The average for the five months, November to March, during the years 1900 to 1936, was 94 inches; for the other seven months, 92 inches. The monthly average for the 37 years is shown in the following table.

<table>
<thead>
<tr>
<th></th>
<th>Inches</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>24.4</td>
<td>July</td>
</tr>
<tr>
<td>Feb.</td>
<td>20.7</td>
<td>Aug.</td>
</tr>
<tr>
<td>Mar.</td>
<td>19.8</td>
<td>Sept.</td>
</tr>
<tr>
<td>Apr.</td>
<td>14.7</td>
<td>Oct.</td>
</tr>
<tr>
<td>May</td>
<td>15.6</td>
<td>Nov.</td>
</tr>
<tr>
<td>June</td>
<td>12.7</td>
<td>Dec.</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is great variation in the rainfall from year to year, from month to month, and from day to day. In 1905 the rainfall was 130.1 inches; in 1906, 147.2 inches; in 1907, 222.1 inches. In 1908 the rainfall was 284.4 inches; in 1909 it was only 145.1 inches, and the next year 198.5 inches. The greatest rainfall for a year was that for 1908, 284.4 inches, the least for a year was 130.1 inches and occurred in 1905.

![Graph of rainfall variation](image)

**Figure 1**—Variation in annual rainfall, United States Naval Station, Tutuila.

The great monthly variation may be illustrated from any year. In August 1915, the precipitation was 12.4 inches, in September 8.8 inches, in October 4
Coulter—Land Utilization in American Samoa

inches, and in November 20 inches. In 1936 the rainfall for July was 5.6 inches, for August 18.4 inches, and for September 7.7 inches.

The daily variations may be illustrated from any month. Their important bearing on land utilization is in the large amounts which fall during some periods of 24 hours and in the fact that there are frequent dry or almost dry intervals of five to ten days. In September 1935, out of a total rainfall of 8.8 inches, 3.4 inches fell on the 25th day of the month. In November of that year 2.4 inches fell on the 23rd and 3 inches on the 24th. In August 1936, 3 inches of rain occurred on the 13th and 5.7 inches on the 14th.

Dry periods are illustrated by 0.8 inch rain from November 11 to 25 inclusive, in 1936, 0.5 inch from October 1 to 10 of that year, 0.2 inch from September 3 to 13, and 0.2 inch from August 25 to October 3. There were similar periods of small precipitation in many other years of the record. The following is the rainfall for a representative month (May 1935), during which the total precipitation was 12 inches:

<table>
<thead>
<tr>
<th>Inches</th>
<th>Inches</th>
<th>Inches</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 0.0</td>
<td>7. 0.0</td>
<td>13. 0.3</td>
<td>19. 0.0</td>
</tr>
<tr>
<td>2. 0.0</td>
<td>8. 1.4</td>
<td>14. 0.3</td>
<td>20. 0.0</td>
</tr>
<tr>
<td>3. 0.0</td>
<td>9. 0.4</td>
<td>15. 0.1</td>
<td>21. 0.0</td>
</tr>
<tr>
<td>4. 0.2</td>
<td>10. 0.0</td>
<td>16. 0.6</td>
<td>22. 0.3</td>
</tr>
<tr>
<td>5. 0.0</td>
<td>11. 0.0</td>
<td>17. 0.2</td>
<td>23. 0.0</td>
</tr>
<tr>
<td>6. 0.1</td>
<td>12. 0.2</td>
<td>18. 0.1</td>
<td>24. 1.5</td>
</tr>
</tbody>
</table>

I compared the weather records for the Naval Station onPago Pago Bay with those available for Leone in the western part of Tutuila and those for Luma on the island of Tau. The data for the Naval Station may be taken as representative in general for American Samoa at sea level; no records have been kept for higher altitudes.

WINDS

The trade winds of the southern hemisphere affect Samoa from April to September; the prevailing direction during those months is southeast. From October to March the winds are variable, but much of the time the direction is northwest. In January, February, and March wind records are commonly "calm" or force "one" on the Beaufort scale. In June, July, and August the wind frequently blows with a force of 2 or 3 on that scale. Force 2 is 4-7 miles per hour and 3 is 8-12 miles per hour (28).
RELATIVE HUMIDITY

The relative humidity ranges from 70 to 90 percent during the wet season, and from 40 to 60 percent during the drier season. The absolute humidity is always high; articles stored away from the wind and sun are covered with mold in a few days.

With regard to the effect of the climate of Samoa on people from the middle latitudes, a Governor states (90, p. 5):

... This climate, where there is so much sun and so little variation of temperature from day to day, and where there are so few diversions, affects people from temperate zones according to their temperamental adaptability to tropical conditions. Those who do not attempt too great physical or mental activities during the middle of the day can remain here for many years with little or no harmful affects. Others, who attempt the same strenuous methods of living to which they were accustomed in colder climates, soon complain of increasing irritability and forgetfulness, with more or less physical breakdown.

![Graph showing variation in monthly rainfall at United States Naval Station Tutuila, 1936, as representative year.]

HURRICANES

Samoa suffers hurricanes at irregular intervals during the hotter season. American Samoa had such storms in 1903, 1913, 1915, 1921, 1926, 1931, and 1936 (51). However, a hurricane does not always affect all the islands severely. In January 1915, the storm was very destructive of property in the Manua group, but was light felt on Tutuila. The hurricane of 1926 was severe on Tuvalu, but Manua was not much affected. The following tables give outstanding characteristics of the storms of 1926 and 1946:
### Table 5. Hurricane, January 1, 1926

<table>
<thead>
<tr>
<th>Time</th>
<th>4 a.m.</th>
<th>8 a.m.</th>
<th>12 m.</th>
<th>4 p.m.</th>
<th>8 p.m.</th>
<th>12 midnight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barometer</td>
<td>29.67</td>
<td>29.62</td>
<td>29.51</td>
<td>29.61</td>
<td>29.38</td>
<td>29.17</td>
</tr>
<tr>
<td>Wind direction</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>ENE</td>
<td>ENE</td>
<td>WSW</td>
</tr>
<tr>
<td>Wind force (Beaufort)</td>
<td>2</td>
<td>2</td>
<td>7/8</td>
<td>12</td>
<td></td>
<td>(above 75 mph)</td>
</tr>
</tbody>
</table>

### Table 6. Hurricane, January 16, 1936

<table>
<thead>
<tr>
<th>Hour</th>
<th>Direction</th>
<th>Force (Beaufort)</th>
<th>Hour</th>
<th>Direction</th>
<th>Force (Beaufort)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E</td>
<td>4</td>
<td>13</td>
<td>SE</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>E</td>
<td>4</td>
<td>14</td>
<td>E</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>E</td>
<td>4</td>
<td>15</td>
<td>ESE</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>E</td>
<td>5</td>
<td>16</td>
<td>NNE</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>NE</td>
<td>6</td>
<td>17</td>
<td>SE</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>NE</td>
<td>6</td>
<td>18</td>
<td>SE</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>NE</td>
<td>6</td>
<td>19</td>
<td>ESE</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>E</td>
<td>6</td>
<td>20</td>
<td>ESE</td>
<td>2.5</td>
</tr>
<tr>
<td>9</td>
<td>E</td>
<td>6</td>
<td>21</td>
<td>ESE</td>
<td>4.5</td>
</tr>
<tr>
<td>10</td>
<td>E</td>
<td>7</td>
<td>22</td>
<td>ESE</td>
<td>2.5</td>
</tr>
<tr>
<td>11</td>
<td>E</td>
<td>7</td>
<td>23</td>
<td>ESE</td>
<td>2.5</td>
</tr>
<tr>
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<td>E</td>
<td>8</td>
<td>24</td>
<td>ESE</td>
<td>2.5</td>
</tr>
</tbody>
</table>

For the 24 hours the clouds were nimbus and the cloudiness 10. The lowest point reached by the barometer was 29.10.

Hurricanes are accompanied by extremely heavy rains. On January 15, 1936, for a 24-hour period, the rainfall at the Naval Station was 10.2 inches.

**Topography**

The climate of American Samoa is associated with topography which a farmer in the United States, with his method of tillage, would consider entirely unworkable. The islands of American Samoa, with the exceptions of Rose and Swains Islands, are of recent volcanic origin, geologically speaking. A submarine eruption took place between the islands of Olosega and Tau in 1866 (44, p. 52). The rocks are basaltic, with the exceptions of coral reefs along the coasts and some beach deposits. In this respect there is a distinct parallel with the Hawaiian islands. Tutuila is situated in a region of frequent earth shocks (25).

The island of Tutuila has a general trend from slightly north of east to south of west; it is 15.2 miles long, 6 miles wide at its widest extent, and 1,400 ft—ds wide at the narrowest place, where the apex of Pago Pago Harbor almost cuts it into two; its area is about 40 square miles. The island is traversed from one end to the other by a continuous ridge of varying elevations rising in places into peaks and descending to the ocean steeply or precipitously. Outstanding
peaks from west to east are Leaefaafagafa 1,104 feet, Oloetele 1,639, Taumata 1,415; Matafao in the center is the highest peak, 2,141 feet; continuing on toward the east, North Foa is 1,616 feet, Pala Pala 1,224 and Olosomata 1,074. There is one large area of flat land on the island, in the southwest—an irregularly shaped plain of about 5 square miles.

Aunu Island lies 1,500 yards south of the eastern end of Tutuila; it is elliptical along an east-west axis 1,800 yards long. It is 1,200 yards from north to south. The eastern half is a crater, the rim of which is 200 feet high, and the northwestern half is flat.

Ofu, shaped like a leg of mutton, lies along an east-west axis 3.2 miles long, the widest part in the west; its highest point is Tutu, 1,587 feet. The coast descends precipitously to the ocean.

Olosega Island has a north-south trend 2.5 miles; it is 1.4 miles wide. From its highest point, Pumsafua (2,096 feet), there is a steep slope then a precipitous descent to sea level. Olosega lies 250 yards from Ofu and the intervening water can be forded at low tide. Both islands are entirely surrounded by a coral reef.

Ta'u is roughly rectangular in shape, 5.5 miles long in an east-west direction, and 3 miles wide from north to south; the west side is longer than the east and there is a broad, deep curve inward in the south coast; its area is about 14 square miles. Near the coast the land rises abruptly—on the east west, and north coasts to an average height of 400 feet; on the south coast to 1,500 feet; the highest point on the island is 3,056 feet.

Rose Island is the most easterly part of a coral atoll by that name; the atoll also includes Sand Island.

Swains Island is a coral atoll enclosing a brackish lagoon about 8 fathoms deep. Swains is about 1.5 miles in east-west diameter and 1 mile from north to south.

**DRAINAGE**

The volcanic islands of American Samoa are drained by scores of short streams which descend from the mountains in valleys with very steep gradients. Many streams are dry during periods between rains, but during frequent downpours torrents of water course over falls and rapids evolved by differential erosion in ashes and pahoehoe lava, ash, and cinders. Some short streams reach the ocean to falls from narrow, hanging valleys; larger streams flow in valleys which have wide, flat floors at their mouths. On the ocean side of the mouths of valleys there are generally wide beaches 10 to 15 feet high built up during storms by huge waves. The beach and the crescent-shaped valley floor at the back of it, called fapa, are generally the site of a village.\(^\text{3}\)

\(^{3}\) For example: Fagauti, Fagano, Fagali, Favaolu, Fagefaone, Fapa in Samoan means trip.
The mountain ridge of Tutuila forms the divide between streams to the north and the south coasts. Headward erosion in a few streams on opposite sides of the ridge has progressed to form gaps crossed by rails. The crater of Auausu encloses a pond. There is a mud lake in the flat part of the island and a large swamp. Ofu and Olosega have no streams large enough to appear on charts of those islands on a scale of 1:80,000. Ta'u has only one permanent stream, Laufiuli River, on the south coast. There are on that island, however, many intermittent streams in shallow, rock-bottomed troughs, most of which are not sufficiently indented in the slopes to appear on a map with 100-foot contour interval.

The basalt of the volcanic islands is so pervious that much of the precipitation seeps quickly into the ground; a few hours after heavy rain there is little evidence of it.

The coral islands have no streams; rain seeps through part of Swains Island into the brackish lagoon; most of Rose Island is a coral reef covered by the ocean at high tide.

Soil.

The soil of American Samoa is in general thin and rocky; some mountain slopes have no soil and agricultural crops apparently thrive on rocks. High temperatures and strong winds dry the thin soil to some extent, but a dense natural vegetation helps to hold the moisture.

Lipman, in Setchell's "American Samoa" (42), furnishes the following notes on the soil of Tutuila:

Owing to the coral reefs which fringe the mountain island of Tutuila, the narrow ribbon of marine or less than level land on which the villages of the natives are built, consists very largely of disintegrated and decomposed coral residues. For that reason and due to the ready solubility of the calcium carbonate in carbonated water, a rich mold has been built up on the surface of these calcareous residues. The reaction of the soil is distinctly alkaline, however, owing to the still very large fraction of undecomposed calcareous material. As one would expect, considering the fragmental character of the constituents of that soil, it is quite porous, and below 5 or 6 inches in depth is still a mass of sandy or gravelly coral residue. With the surface mold and coral detritus, there is admixed a small proportion of clayey materials which results from the disintegration and decomposition of the volcanic rocks and of shales on the mountain above.

The soils of the mountain island proper represent the weathered remains of basaltic rocks and of shales. The shales presumably are a metamorphosed clay soil, which was formed originally from the older volcanic formations. Both the basaltic and the shale, however, are constantly disintegrating. It is so eaten away that it is difficult to say how much of the original rock has been disintegrated and how much is left standing. The effect is much less marked on the mountains that reach down to the sea, and the most uniform and characteristic character of the lands along the coast is a sandy-turf vegetation.

The two classes of soil materials, namely, the very narrow level fringes and the mountain soil, are, therefore, sharply distinct from each other, both as regards origin and present nature.

The level, narrow ribbon of land on the other side of the mountain from Pago Pago at Pagasa is somewhat different in character from that in Pago Pago in that
there seems to be a larger proportion there of gravel, and of a size almost approximating cobblestones, which represent water-worked rock masses which have evidently come down from the mountain. The proportion of calcareous material in that land, therefore, is probably smaller than that in the land of Pago Pago.

That the adaptability to soil masses of widely different origin and nature characterizes part at least, if not all, of the tropical vegetation at Tutuila is evidenced by the fact that the coconut tree seems just as happy on the volcanic mountain side as it is on the narrower fringe of calcareous material bordering the island and supplied part of the time, at least, with considerable saline material. This is just one more of the many examples which may be mentioned which tend to discredit, or at least indicate that there is no proof for the idea of a specific adaptability of crops to soil.

I observed that banana plants, breadfruit trees, sugar cane and other crops of the Samoans thrive equally on the calcareous border strips and the volcanic mountain slopes.

Setchell (42) continues, stating:

Besides the general character of the soil thus described by Lipman, there are sandy strands of beaches which have their particular types of vegetation, and the not entirely drained swamps, of very small areas on Tutuila, both of which is moisture and humus content must depart widely in one direction or another from the types.

Besides the matter of texture and chemical nature, the soil of different exposures and relations to the underlying rock or stony subhorizon differs in depth and drainage. In general, the soil is not of any considerable depth, so that it soon dries out after rains, even of the quantity of a tropical outbreak, so that a few rainless days cause a noticeable drying effect. The thin soil and rapid drainage make the steep slopes and ridges very dry, and such areas or spots have a peculiar flora irrespective of their altitude.

Thus the top of Matafeo, the highest point on Tutuila (234 feet) and a dry hank near sea-level have certain plants in common, not found in the intermediate rain forest. The nearly vertical cliffs have little soil, but their sides have vegetation, often of abundant forest type.

Oufu and Ofuuga have soils similar to that of Tutuila. Most of the soil of Aunuu is made from the decomposed volcanic material and contains a large amount of organic matter.

Setchell states of Rose Island (from notes furnished by Lipman, 42, p. 236):

Rose Island consists of an upper layer of soil which is organic and which is rich in particles of uncomposed lithosumum. It is black when wet, dark brown when dry, and is much like a peat of calcareous origin. Underlying the soil layer are partially decomposed lithosumum masses, a very light material because of the very large percentage of pore space. Finally below the layer just mentioned is a fine-grained lime stone.

I have no data on the soil of Swains Island.

POPULATION

The population of American Samoa, 10,055 in the United States Census Report of 1936, is now (1937) over 11,500. The people are nearly all natives of Samoa. Of the 8,987 persons of native birth reported in the census of 1930,
8,040, or 89.5 percent, were Polynesians. Of the 1,068 foreign born population 886 or 83 percent were Polynesians. Of 193 white people of that census, 188 were born in continental United States.

The following table is from the census of 1930.

<table>
<thead>
<tr>
<th></th>
<th>Native born</th>
<th>Foreign born</th>
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</thead>
<tbody>
<tr>
<td>Polynesian:</td>
<td>8,040</td>
<td>886</td>
</tr>
<tr>
<td></td>
<td>Mixed**</td>
<td>133</td>
</tr>
<tr>
<td>White: (includes 178 Naval personnel):</td>
<td>193</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>Native born (in the U.S.)</td>
<td>16: Japanese, 5</td>
</tr>
<tr>
<td>Other races:</td>
<td>Native born</td>
<td>12: Chinese, 6 Negroes, 13: and 8 of other colored races</td>
</tr>
<tr>
<td></td>
<td>Foreign born</td>
<td>94</td>
</tr>
</tbody>
</table>

**Several permanent white residents of American Samoa estimate that the number of people of mixed blood is appreciably higher than the census figures indicate.

The people live in small scattered villages situated, with few exceptions, on faga. There are 65 villages in American Samoa, with an average population of about 175.

Two of the larger villages are situated on Pago Pago Bay: Pago Pago with 940 people and Fagatogo with 743. There are 10 villages altogether about this bay with a total population of 2,970; many people of mixed blood live there. Nearly all the white people are at the Naval Station or in that vicinity. This large concentration of people around Pago Pago Bay is a modern and recent development. The village of Leone in western Tutuila, which has 732 inhabitants, is also of recent growth.

Thirty-one villages have less than 100 people each. Fagatole and Utumes, two of the smaller villages, have only 30 people each. (See fig. 7, p. 39.)

THE SAMOAN FAMILY

A discussion of population and land utilization in Samoa would not be intelligible without a brief description of the Samoan family (aiga). The aiga is a social group of about 10 to 50 people living as a unit in a village. The matai (head) is the ruler of his family and directs its economic and political activities.

The family usually consists of the matai, his wife and children, relatives and their children, and adopted children. In some larger families there are two or three "small matais" under the direction of the head. Each family is a self-sustaining economic group, the members of which, including the head, cooperates among themselves for the common good. In many cases, this family is quite large, and it is impossible to trace the relations of all the members; but there is none that is not related to the head. The family is also the social unit, and its members constitute the tribal group.

*The Samoans also have a word, fomen, for "family" in the United English sense of a man, his wife, and their children.
tively contribute the products of their labor to the family. Mead (32, pp. 22, 40) states:

... Theoretically, a household [family] would consist of the mana, his unmarried brothers and their wives and children, his mother and father, if alive, his sons and their wives, and children, his unmarried daughters, and his widowed daughters (p. 21).

... The mana directs activities, administers justice, provides protection, shelter, and food, to those beneath his roof. The members of his household in turn obey him, serve him, and depend upon him (p. 40).

The land owned and operated by a family under a sasa are called plantations; the word is used in that sense throughout this paper. A family generally owns from five to ten plantations of various sizes from about a twentieth of an acre to three or four acres. They are in scattered locations, most of them near the village in which the family lives. Some of the larger land holdings are controlled by family heads with titles of high chiefs and high ranking chiefs.

There are from five to twenty-five families in a village. Their heads meet in village discussion groups (femo) where most matters of inter-family and village concern are discussed and decided, including land boundaries and other land matters. The femo is a directive for much cooperative economic effort, and has wide social and political powers.

THE LANDSCAPE

The landscape of American Samoa1 from the shore line inland presents a variety of scenes of native villages, plantations, and natural forest. The typical Samoan village consists of a group of native houses (fale) spaced about a village green (le着眼于). It is situated on the beach at the mouth of a valley (the lepi, p. 14). A grove of coconut trees protects it from ocean winds.

The most conspicuous features of the houses are the heavily thatched, domed roofs supported on stout posts (pl. 1, A). Two or three long, low, thatched boat sheds project from among the dwellings; fishing boats, with decorations fore and aft, are drawn up on the beach, and dugout canoes (papuano). Small concrete copa sheds with corrugated iron roofs stand near the edge of high water in most villages. A large white-washed, concrete church, also with an iron roof, stands in remarkable contrast to the native houses. In some villages there are churches in various stages of construction, partly covered with grass and mats; in others stand dilapidated walls of abandoned churches.

At the back of the village, on the land side are ovens (ama), one for each home—little thatched structures over piles of small stones. About the ovens are small irregular patches of the more important Samoan food crops—mostly bananas, breadfruit, and a few giant taro. The patches range in area from a few square feet to 100 square yards; towering above them are more coconut trees.

1 Twas and feno folates are treated separately at the end of this paper, pages 43-44.
Trails lead from the village up the valley and mountain slopes. The slopes have heavy stands of coconut trees under which grow luxuriantly bananas and scattered breadfruit. Between the trees there is a rank growth of shrubs, ferns, and weeds.

Above the coconut plantations is a dense natural forest, in which are clearings where taro is planted—the malufæa or main taro lands of the village. In the clearings are dead trees still standing, killed by girdling or by lighting fires around the bases of the trunks; there are stumps two feet high of those that have fallen, and rotting trunks and thick branches lying on the ground spread out in various directions. Among these forests remains taro grows in various stages of development from plants a few weeks old to mature plants seven or eight months old. Yams grow with taro in some clearings, their vines clinging to short poles or trailing on the ground. Near the taro plantations are older clearings formerly used for taro, now used for bananas. Giant taro is also found in them. Many old taro lands have reverted to second growth forest.

Surrounding the taro plantations are hibiscus trees (Hibiscus tiliaceus), tree ferns (Cycads, Cyathus plagiotrochos), Aiptasia stapyloides (toil), and many other trees, shrubs, herbs, and ferns, which constitute the natural forest (vaa mafau), or bush. The forest is characterized by an extraordinarily luxuriant growth of vegetation. Epiphytes are lodged in the branches of trees and shrubs, and vines form masses over their stouter associates. [For a detailed description of Samoan forest plants see Christophersen (7) and Sutchell (42).]

There are few trails through the higher parts of the forest; the usual way to get there is up the dry beds of streams, around deep pot holes, over step-like formations worn by the streams in layers of lava and other volcanic ejecta. It is a laborious trudge through an oppressive miasmatic atmosphere.

In the lower forest, especially along the trails, there are many introduced weeds (p. 28).

The landscape of part of Pago Pago Bay is marked by the buildings of the Naval Station: tall steel masts of the wireless, barracks, and officers' quarters, wharves, and a navy yard. The villages in that area have Samoan houses, American frame buildings, and various combinations of the two. Slopes above them lying at angles of 40 to 30 degrees are used for plantations.

Minor variations in the landscape occur here and there. The small island of Aumau has almost no natural forest; the taro plantations there are in swamp lands. A few swamps, found along the coasts of other islands, have dense growths of mangroves.

* In Samoan words in this paper the glottal stop, represented by the inverted comma, is included except in geographic and proper names. When it occurs in a word initially or centrally, it has the usual effect; this conforms with the usual spelling of Samoan words.
PLANTATIONS
The tree plantations in American Samoa range in area from 0.5 to about 4 acres, excluding the small patches of planted land in the immediate vicinity of the native houses. Two land-sites from 0.2 to 0.5 acre. Coconut plantations occupy the largest area; parts of them, as already indicated, include bananas and breadfruit.

Each village group owns the plantations in its vicinity. But people from another village may have lands there too—by permission, through marriage, relationships, or by grants of plantations which have come down by heredity and which were originally given to a family chief as a reward for valor in battle.

Each plantation, of whatever kind, has a specific name, by which it is identified by the family that owns it. Corners of plantations are identified by certain trees generally with marks on them, by large rocks, or by other natural features. The ownership of trees growing near the imaginary lines which form their boundaries is exclusive and should be a member of one family take a coconut from a tree belonging to another, there is trouble.

On most of the coconut lands the trees are a volunteer growth, sprung from nuts which have fallen. A visitor soon learns to recognize several varieties of coconuts: *ma oai*; the tree with the largest fruit, *ma oai*; with long, narrow fruit, and *ma oai* with small ones. Nine other varieties are recognized in Samoa (7, p. 38).

Bananas are planted in parts of the coconut plantations near the villages, but most families have plantations which are used mainly for bananas. Seventy-five varieties of bananas are found in Samoa, *faut palaulu* (Chinese banana, *Musa cavendishii*) and *faut palu* (M. paradisaece) being among the more common in American Samoa (7, p. 28).

There is no systematic planting of breadfruit (*malu*), which grows on many years—Samoa does not know exactly how many—and which is seen everywhere. Besides furnishing one of the staple foods, it is extensively used in building native houses. There are many varieties named by the Samoans, some of them not considered very good too eat (7, pp. 72, 73).

Nearly every village has patches of paper mulberry, the inner bark of which is used to make tapa cloth (above). Among several other tree crops in the islands, pandanus (fale) and paper mulberry (*Ve, Bruguiera papexera are important, but they occupy a very small part of the total area used for crops.

Pandanus is common growing alone or in small patches near villages. The leaves of the varieties *fale* and *papexera* are used by the Samoans (for making floor mats and sleeping mats; mother and distinct variety, *kofo*, is used for fine mats. A large export of mats, developed in recent years, has stimulated the propagation of these varieties, and beds of young trees are seen here and there.
Kava (kava, *Piper methysticum*), a small shrub with large roots, is cultivated. The dried roots are used in preparing the important ceremonial drink. The shrub is commonly planted in places where there is some deep soil where the large roots may develop fully.

A few kapok trees (samar, *Ceiba pentandra*) grow in the villages. The floss from the seeds is used for stuffing pillows, which are now more commonly used than the bamboo head-rests of aboriginal Samoa.

Several species of citrus are found in the islands. The native Samoan orange (mai sanoa, *Citrus hystrix*), grows in forests on the lowlands. The fruit is sour and seldom eaten, but the juice is used by the Samoans as a shamus. The citron and lime also grow wild.

The *Carica papaya* (svi) is an American plant well established, especially on Tutuila. It is not prized by the natives, but is popular with white people in the Naval Station.

The avocado (*avoiota*) grows wild.

**Non-tree crops**

Of the non-tree crops in American Samoa, taro (*tale, Colocasia esculenta*) is the most important; it is second only to bananas as a food crop and is preferred to bananas when the supply is large. Taro is acceptable as a ceremonial gift on important occasions. The higher plantations in Samoa are almost exclusively taro; many of them are at elevations of from 700 to 1,000 feet. The lands used are clearings in the forest where the soil is virgin, or where sufficient time has elapsed since the last planting to set the forest grow up and provide the soil with plant food. Taro plantations (*valuamaga*) are farthest from the villages. They are generally grouped together, identified with the villages the families of which own and operate them. Christensen (7, pp. 41-42) lists 59 varieties of taro found in Samoa. Among those commonly seen are niu, sanoa, and mamo. The varieties cultivated in the swamp on Aumau are similar to those raised elsewhere in American Samoa. Wild taro grows in the forested lands and is edible, but not relished by the Samoans.

Giant taro (*ta'amua, Alocasia macrorrhiza*) is cultivated mainly as an emergency crop for use after hurricanes. The corn will remain several months in the ground without spoiling. Some varieties of *ta'amua* grow wild in the forest.

The cultivation of yams (*uf, Dioscorea datia*) is not important in Samoan agriculture; on the island of Tau, however, the areas used for them have increased in recent years. A great many varieties of yams are recognized (7, pp. 52-53). One of them, *sio zima* (*D. bulbifera*), is common as a spontaneous plant in coconut plantations and in open places in the lowland forests; it is eaten by the natives only during hurricane famines.
Cassava (*Manihot esculenta*) is commonly cultivated in little patches, mostly near the houses in the villages. Two forms are distinguished by the Samoans, *muniota*, which is made into starch, and *tapoka*, which is made into pudding.

Sugar cane (*Saccharum officinarum*), which is raised in patches near all the villages, is grown almost exclusively for house thatch. The variety commonly propagated is called *talo fua las*. *Talo ula* and *talo fiti* are sweeter varieties, chewed by children.

Tobacco (*tapoa*) came into Polynesia with the white man, and Samoans have developed strong varieties. The leaves are cured dark, and twisted into short ropes.

**FAMILY PLANTATIONS**

The plantations of the Afoa family in Taputimu village are representative flatland plantations. The family owns seven plantations, which together have an area estimated at seven acres.

The Afoa family includes Afoa, his wife Pito, and eight children; his sister and her husband and three children, two of whom are married and have one child each; and a nephew of Afoa with one child.

The family lives in five houses. Near the main house in the village there is a patch of bananas and one of giant taro, each 50 square yards in size; also nine breadfruit trees and five kapok trees.

The largest coconut plantation, called Malates, is about one mile north of the village. The boundaries enclose an irregularly shaped area of about three acres. The coconut trees are from 3 to 24 feet apart, some of them not yet bearing. Breadfruit trees are scattered here and there and seem to be in a twin of one breadfruit tree to 20 coconut trees. In much of the plantation weeds are growing waist high, mostly *fualele* (*Erectites valeriaefolia*) and mile-a-minute weed, which covers some of the coconut trees to their tops. In other coconut trees bird's-nest ferns (*Laoga papa, Asplenium nidus*) are lodged. Rotting husks and twigs branches of coconut trees strewn the ground. The following forest trees in the plantation were identified by Mauga, son of Afoa and my informant: *fruganuulu* (*Himatanthus matanus*), *matai* (*Dysoxylum maire*), *fuatua* (*Kleinheerta hospita*), *ou va* (*Casitina merrillii*), *tapo* (*Kahia taliensia*), *maui* (*Casinum odoratum*), *atono* (*Myristica hyrbryarea*), *papano* (*Littre sp*), *lama* (cedar nut tree, *Heronia moluccana*), and *vea* (*Blachella peruviana*).

The Tuapa coconut plantation of the Afoa family, about 0.25 mile north of the village, is one acre in size and looks much like Malates plantation. Its boundaries are very irregular and some of them are marked by old coconut trees which Mauga said he knew well, for his father had shown them to him many times. Tuapa is separated from Malates by plantations of other families.

* Few of the indigenous plants in Samoa have English names.
In one quarter of the area of Tuapa, bananas are planted among the coconuts; they were planted by Seona, nephew of Afoa. Plants in Tuapa plantation not seen in Malaea are: three guavas, one pandanus, one mango, and five wild pineapple plants. At the time of my visit there were three fe'i, tall stakes with ripe coconuts strung about them, left to await a copra cutting.

The Letoa coconut plantation is about 200 yards away from the village. Along its borders, Masuga and I climbed over large dead tree trunks and crawled on hands and knees through dense clumps of natural forest. It is about an acre, nearly flat, rectangular, the corners marked by two large fe'i trees, a large aca tree and a coconut tree with an X blazed on the trunk. This plantation has more and older breadfruit trees than Malaea—about five or six breadfruit trees to one coconut tree. In much of the area the coconuts are ten yards apart; in recent years, however, nuts have been allowed to sprout where they fell, and in some places are growing two or three feet away from the parent stems. Large mud nests (one) of ants with larvae in them, are attached near the bases of coconut and other trees.

On the edge of the plantation nearest the village there is a patch of sugar cane, tofofa'ata, 150 square yards in area and one of tobacco 100 square yards in area. The tobacco patch has stumps of small 'o'a and ma'a trees in it, and two outcrops of large, flat rocks.

Three of the family coconut plantations—Pagota, Tuafale, and Foafuliava—are between the village and the coast, which is one third of a mile away. Tuafale and Foafuliava are about half an acre each and Pagota is a little larger. The three plantations and some of those of other families are within a large enclosure where the village pigs are kept, walled on three sides, and bounded by the rocky coast line on the fourth. The corners of these plantations are marked similarly to those of the three described. There are two kava shrubs on Pagota, powali trees on Tuafale, and yawa (Diocores alata) on Foafuliava; a few pandanus trees grow on Tuafale and on Foafuliava.

The taro plantations of Tapurimo village are about a mile and a half from it. The trail to them leads through banana and coconut plantations, up a slope through patches of weeds shoulder high and clumps of natural forest. The taro lands are in an old volcanic crater. Borders of plantations are marked by giant tara, piles of dead wood, and growing trees.

The taro plantation of the Afoa family is about 0.33 acre in area. In it, among charred logs, dead branches and stumps, are raised three kinds of taro—wina, wane'a, and pula. Taro tops had been planted in one sixth of the area shortly before my visit; there the ground between the plants was covered with a mulch of dead vegetation to keep down weeds. In the rest of the plantation the taro plants were in various stages of development. The Afoa taro plantation had also two cassava plants and one yam. The yam was planted by Masuga as an experiment.
The Afoa family has no paper mulberry patch. The women obtain the bark for tapa from relatives in another village. Other family chiefs see that their plantations include patches of paper mulberry.

The plantations of Samoans on the mountain slopes are very similar to those of Afoa, but the terrain is difficult to traverse. It is almost impossible to walk along the borders of many of them.

**LAND UTILIZATION**

Statistics of census reports on agricultural crops in American Samoa are based on estimates which probably vary considerably from the actual figures. As already indicated, there are no farms in the islands which fulfill the definition of a farm given in the census report of 1930. A "farm," for census purposes, is all the land which is directly farmed by one person, either by his own labor alone or with the assistance of members of his household or hired employees (47, p. 10). In view of the fact that Samoans have no unit of area, it would be impracticable to undertake the task of obtaining accurate figures for acreages and crops. However, the following figures from the census report of 1930 indicate the general situation.

**Table 8. Number of Fruit Trees and Quantity of Fruit Produced (1929)**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Trees (number)</th>
<th>Quantity produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>coconut</td>
<td>275,000 (bearing)</td>
<td>13,600 (bunches)</td>
</tr>
<tr>
<td>banana</td>
<td>262,590</td>
<td>256,590 (bunches)</td>
</tr>
<tr>
<td>breadfruit</td>
<td>25,239</td>
<td>2,552,037</td>
</tr>
<tr>
<td>papaya</td>
<td>18,494</td>
<td>18,490</td>
</tr>
</tbody>
</table>

The census also reports alligator pears, citrons, lemons, limes, mangos, oranges, and pineapples; those products, however, play a very small part in the scheme of land utilization.

**Table 9. Acreage and Quantity Raising of Specified Agricultural Products (1929)**

<table>
<thead>
<tr>
<th>Product</th>
<th>Acres harvested</th>
<th>Quantity produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>taro</td>
<td>714</td>
<td>1,760,000 (bushel)</td>
</tr>
<tr>
<td>yams</td>
<td>67</td>
<td>189,000 (bushel)</td>
</tr>
<tr>
<td>tobacco*</td>
<td>168</td>
<td>9,010 (bushel)</td>
</tr>
<tr>
<td>sweet corn</td>
<td>4</td>
<td>5,676 (bushel)</td>
</tr>
<tr>
<td>sugar cane</td>
<td>11</td>
<td>63,675 (bushel)</td>
</tr>
</tbody>
</table>

*It is likely that the acreage of tobacco was taken as is now less than 25% of that stated. The unit quantity produced might read "plant" instead of "bushel."
Table 10. Varieties of Livestock and Number (1930)

<table>
<thead>
<tr>
<th>Variety</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>cattle</td>
<td>606</td>
</tr>
<tr>
<td>horses and colts</td>
<td>215</td>
</tr>
<tr>
<td>hogs and pigs</td>
<td>5,170</td>
</tr>
<tr>
<td>chickens</td>
<td>16,198</td>
</tr>
<tr>
<td>ducks</td>
<td>481</td>
</tr>
</tbody>
</table>

Three of the four more important food crops of the Samoans are tree crops: coconuts, bananas, and breadfruit. Bananas and breadfruit, however, are much more important as food than coconuts. Most of the areas used for these crops are mountain slopes; many plantations lie at an angle of 45 degrees; in parts of the islands I noted coconuts and breadfruit growing on slopes of 60 degrees. The people of some villages have almost no flat land except their village sites.

Agricultural Methods

Samoan methods of agriculture are much the same as they were when the islands were discovered by Roggeveen in 1722. The digging stick (‘ava), is still used for planting (pl. 1, B). It is of hard wood, generally *Itea aemulifolia*, about 5 feet long and 2.5 inches in diameter, pointed at one end. It is pushed into the ground to make a hole in which the seed or young plant is placed (5, p. 545). Since much of the ground is rocky, a sharp iron or steel implement would soon become dulled.

A bush knife is generally used for cutting trees. A steel blade, which replaces the ax of pre-discovery years, is about three feet long and three inches wide, curved outward at the end. The knife is also used for any weeding that is done, swung with a rhythmic movement backward and forward. A Samoan remarked to me, "If a hoe were used for weeding, it would have to be sharpened ten times a day." The ax has been introduced for felling trees, but I did not see one in use.

In planting coconuts, a hole just big enough to hold the nut is made in the ground. The trees, therefore, are shallow rooted, like volunteer trees. They are planted close together and have only a small area of soil from which to draw nourishment. Trees and other plants allowed to grow in the plantations deplete the soil. The yield of nuts, therefore, is small. A good coconut tree, properly planted and looked after according to western agricultural methods, bears 50 nuts a year; the average yield of trees in American Samoa is less than half that number.

Samoans plant several kinds of trees, intermingled, in an area because of the difficulty of clearing land and of keeping it free from brush and second-growth trees. In the high temperature and heavy rainfall, vegetation grows with extraordinary rapidity.
On the new coconut plantations bananas are planted so that there will be a return from the land for the six or seven years before the coconut trees bear. After the fruit is taken from a banana tree, the tree is cut down. A shoot is allowed to grow from the old root and bears a new bunch which is ready to eat in from seven to nine months. After he cuts the old plant, the Samoan swings his knife a few times about the base of the new shoot to cut the weeds.

New breadfruit trees spring from the roots of the old. Occasionally, however, Samoans plant a few young trees of a variety they especially like.

Three crops of taro are grown in a forest clearing (pl. 1, C), each requiring seven or eight months to mature. When a plant is pulled out of the ground, the top is cut and planted about a foot away from the old one. At the end of two years taro lands are abandoned and new clearings made. Samoans rotate their taro lands instead of their crops. Only patches where young plants are growing are weeded. If an area were always kept clear of weeds, whatever soil is there would soon be washed away by the rains especially on slopes, where nearly all taro is planted. Weeds also help to keep the thin soil moist. Taro on high, sloping lands can be left in the ground several months after it is ripe. Taro on low, flat lands, where the soil is generally swampy, must be harvested and used soon after it has matured.

Some or all of the families of a village unite to prepare new taro lands for cultivation. The solo iau is a taro plantation made by the young men of a village collectively. They clear the forest and subdivide the area into a number of patales—one for each man, who looks after his own crop.

The people of Amahave in western Samoa are in circumstances typical of those of the inhabitants of many villages; they have used all good taro lands near their village and are pushing farther back into the native forest to clear new land. The nearest taro lands to the village, about 0.1 of an acre in area, are now about two miles away. They are connected with it by a difficult trail up the slopes.

I watched a Samoan near the village of Fagatogo planting taro. With his knife he cleared a strip of mili-a-minute weed, allowing it to roll down the slope as it was cut. He used his digging stick to plant the tops, taking it in both hands, raising it, and forcing it into the ground. The slope, which I estimated at 50 degrees, was so steep that he had to secure a foothold before he forced the stick into the soil. (See plate 2, A.)

In swamp lands, taro beds are elevated by building up the mucky soil and draining the ground through canals. On the island of Amanu the swamp taro can be harvested and used after four months, but it is best after five or six months. When the tops are planted, coconut leaves are spread about them on the ground to inhibit weeds. The land is cropped continuously.

Yams are grown by raising joxa hilllocks about them as they get larger. There is so little soil that the methods of planting yams well beneath the surface is not possible. After six months of growth, yams may be harvested; but
if left in the ground the tubers keep on growing larger for a year, some of them becoming as much as 2 feet long and 8 inches in diameter.

Little work is necessary for the planting of other crops. Sugar cane is planted by slips, and the leaves are big enough to use for thatch in three or four months. Pandanus is grown mostly from seed, though shoots are also planted. At the end of a year leaves may be cut to make mats. The plants develop into trees and grow for many years. When the stems of paper mulberry are cut, new ones develop, so the produce of the same patch is used for a number of years. Cassava is planted by slips which are merely stuck in the ground. Kava, also planted by slips, grows best in dry soil. The few kava shrubs of a family are generally distributed among several of the family lands.

Tobacco seedlings are planted in little beds near the native houses and the seedlings transplanted shortly after they have come up. There is no special time for planting or harvesting. Since taro tops are planted as the corms are harvested, the crop matures successively and no storage is necessary. Harvested taro remains edible only a few weeks. A few foresighted Samoans plant some taro in December, for if a hurricane comes in January, the plants are too small to be injured, and the crop has a good start when the hurricane is over. More yams are planted in June, July, and August than in other months. When the hurricane season arrives, they are ready for use, and they keep well in storage.

Samoans plant during the time of full moon more than at other times of the month. They plant when the sun is high in the sky, rather than in the early morning or late afternoon.

RESTS

Like all agriculturists, the Samoan is bothered by pests. The more troublesome have been introduced into his country from other lands. The coconut beetle (Oryctes rhinoceros) first appeared in Western Samoa in 1910 (30, p. 34) and spread from there to American Samoa. This common pest of the coconut palm tunnels into the soft wood at the growing point of the tree. The government of American Samoa requires the destruction of rotten logs and other decomposing vegetable matter upon which the larvae of the beetle feed.

The coconut wasp (Agrilus) is an insect which eats the leaves of the coconut trees. Samoans do not bother much about it, but while people have introduced a spray.

Flying foxes (Pusa) feed mostly on breadfruit. Natives know their haunts and catch them in nets. Rats eat fallen coconuts, making holes through the husks and shells of the fruit, and they destroy other crops also. In 1935 the boys of Leone school attempting to demonstrate a little-known crop in American Samoa, put a quarter of an acre in sweet potatoes which were expected to yield 800 pounds. Only 54 pounds were harvested; rats ate the rest (31, p. 55). In 1937 public school
children engaged in a rat-catching contest and received bounties for the numbers they caught.

Plant pests thrive throughout the islands. Fall (Spinacea ornithopterum) is well established. It is said that it came into American Samoa in horse fodder. Ilie grass (Urochloa idahoensis; "white man's pest"; Centaura echinodonta) occurs along trails. Mile-a-minute (Mikania micrantha; fua itai) is a recently introduced weed, which has spread in the lower lands. Paspalum conjugatum (vailima) is widely distributed—associated with mile-a-minute weed—in some parts of the islands covering the ground in large patches. Vailima roots deeply and is pulled up by hand with great difficulty. It grows abundantly on a large area of O Lewis, and is found in many other places in the islands.

There is as yet no plant quarantine in American Samoa, and it is likely that new pests will be introduced. An outstanding fact about exotics such as vines, grasses, and other weeds is that they require for their removal the use of agricultural implements, such as hoes and spades, to which the Samoans are not accustomed. Samoans are both to adopt new tools.

LIVESTOCK INDUSTRIES

Of livestock industries in American Samoa, the natives are most interested in the production of pigs and poultry. Pigs enable a family to make a good showing at various ceremonial functions demanding pork. They are generally kept near the villages in enclosures, the animals marked to show to which family they belong. The meat of the coconut is their principal food; those being fattened are also fed the waste of nearly every kind of food that the people eat. Pigs are carefully looked after and frequently get out of their enclosures to damage taro and other crops.

At feasts for ordinary guests fowl is an economical substitute for pork, thus many families raise chickens. Some run about the villages and eat refuse food; others stay in the plantations and are fed on coconut meat. Young chickens are fed the larvae from the moth pests of ants.

On the small plain in the western part of Tutuila, horses are used to carry baskets of coconut meat. They cannot be used successfully on the rugged terrain of the rest of the islands. Cattle are used on the plain by the Mormons on a coconut plantation, and by a few Samoans, to graze the ground between trees.

All the livestock are poor animals, of breeds that could not be identified. Most of the horses would not be allowed to exist on American farms. Peahens of poultry curl in a grotesque manner, and fowls are popularly referred to by white people as "hurricane chickens."

CULTIVABLE LAND

The area of plantations in American Samoa is only a small proportion, about a third, of the total area that might be so used. However, that is not
allowing for rotation of taro lands. By their method of taro growing only a small part of the total area of forested land is in use in any one year. It is difficult to make an estimate if one considers Samoan methods of land utilization. Conservatively, the area of plantations could be increased by one half their present dimensions without pressuring on the available land. Since by far the larger area of land is used for tree crops, those crops could be raised on the slopes of the mountains and on inter-mountainland distant from the villages where there are areas of natural forest which have slopes less steep than much of the land at present used for plantations. But the people of some villages would have to walk two or three miles to their plantations over difficult terrain, and distant plantations would have to be guarded against thieves.

In a thinly populated area, as American Samoa was formerly, the system of rotation of the land is in harmony with the conditions generally. The cultivated plots are widely scattered. Soon after they are abandoned they are covered with young forest, which, in due course, grows to be indistinguishable from the surrounding primeval forest. This system has been practiced from time immemorial. It is a form of primitive economy in which the amount of land needed for a small group of people is large.

During the last 40 years the population of American Samoa has doubled. The increased population makes it necessary to use the clearings more often, and there is no longer opportunity for the soil or the forest to recuperate. About Pago Pago Bay, for example, the cultivated plots are now close together. In the mountainous country of Samoa an outstanding result of the repeated use of forest clearings for agriculture is soil erosion. Soil erosion is increased in places by clean weeding. A practice which has been discontinued in other rainy tropical climates. In Fiji and in Malaya, countries recently visited by me, clean weeding has been found to be injurious to the soil. On banana plantations in Fiji, grass and weeds are controlled, not eradicate. The following opinions regarding the practice are noteworthy: Moore states (14, p. 11) that cover plats protect the soil, and so prevent the rain from breaking it and washing it away. Wright maintains (53, p. 10) heavy losses of top soil are experienced where no steps are taken to combat the adverse influences engendered by erosion. In a clearing, a cover should be put down to prevent erosion and maintain an even soil temperature (14, p. 81).

PRODUCTS OF THE FOREST

The forest in Samoa affords useful products without requiring any replenishment. Some of them are important as emergency foods. Wild taro and yams are edible. The fruit of the Tahitian chestnut (Iresine confervoides) and the heart of the tree fern (Cyathea plagiostegia) are relished. The arrowroot (Maranta, Tacca pintarriifida) is established in the forest. Its root (Nd mana) is used to make a pudding and to make a paste for gluing barkcloth (sape).
The forest is most important to Samoans in that it supplies wood for making boats and houses. Popular hardwoods for canoes are tāva (Rhizopteris speckii), pipi (Hermandia moorehaukiana), maota (Dracaena cinnabari), and maali (Terminalia ochrida). Camanum odoratum, a soft wood, is also used. Anyone may take a tree from the forest from which to furnish a canoe. Boats are made by trained craftsmen.

Much of the lumber for a Samoan house is from the breadfruit, and coconut wood is popular. However, from the natural forest there come ari (Endandra eleocephala) and poumali (Securinega sp.), very hard woods used for house posts. Among other forest trees used are puapa (Guatteria speciosa) and toi (Alpinia setacea). The isile (Istria bijuga) is a tree much prized. The wood is used for middle posts for houses, for kava bowls, and for many other things. Fan (Fibocarum villosus) is abundant and very highly esteemed. The wood is used for construction and for fires; the fiber from its bark makes girdles, cordeage, and strainiers for kava.

The forest also supplies wood for digging sticks, husking stakes for coconuts, tapa beaters, and bamboo pillows. Various kinds of flowers are taken from the forest to perfume coconut oil: lapali (Aглаia samoensis) and maali (Cynamum odoratum), the sap from the maali tree (Camanium samoensis) is used for the same purpose as are the seeds of the kiri (Parinari glaberrimum), and the leaves and stems of the aina (Pilea cincta). Most of the forest land is held in titles by chiefs; and the ownership, handed down by tradition from generation to generation, is well known. Some of it has passed into the hands of families which are now small, whereas many populous families used more forest land. The shortage of forest land is greatest around Pago Pago Bay, where the population has greatly increased. I saw steep slopes, which should be kept in forest, being cleared for taro.

The pressure of the population on the products of the land is a factor in liberalizing the use of forested land and making its products available to members of families who, in former times, would be rigorously barred from it by the titled owners. I was told by some chiefs that the products of the forest were to be kept by anyone who went into the bush to get them. However, their ownership as well as their distribution is a limiting factor in their usage.

PRODUCTS OF THE OCEAN

Fish are plentiful and are the most important flesh diest of the people. The pools on the coral reef are a source of abundant supply; from them, fish are taken with rods and lines, spears, nets, and traps. Mullet, sea eels, octopuses, and a host of other varieties are caught. One method of reef fishing is by poisoning or stunning; at low tide the powdered seed of the fia tree (Barringtonia asiatica) is scattered in the pools.

The open sea furnishes mainly bonito, mackerel, sharks, swordfish, tuna, ulua, and barracuda. Bonito are caught by trolling with special canoes. Worm-
like marine animals (palolo) are scooped out of the water near shore during their breeding season (October and November).

It is important to note that the Samoans do not have the art of drying fish, and, so far as we know, never did have it. The great moisture in the air makes it difficult to dry fish and to keep them after they have been dried. Furthermore, saving for the future is not a trait of Samoan character.

Fishing is less important to the Samoans now than in earlier years, because of the introduction of canned fish.

**THE COPRA INDUSTRY**

Ripe coconuts for copra generally lie under the trees for a month or two, until there are enough to make a cutting worth while. Men from plantations near the villages are gathered from time to time and strung around poles in villages where they remain until it is decided to cut the coconuts. Storing them thus (teti) keeps them from rats and thieves. The government prohibits harvesting green nuts for copra because of the inferior quality of the product.

The nuts are husked, split open with the backs of bush knives, and the meat cut out in strips. The fresh meat is dried on mats near the houses and is raked by hand at intervals to dry it evenly. In dry weather the meat dries in four days, but the average drying period is seven days. When showers come, the mats are hurriedly dragged inside.

The copra is carried in baskets to the village weighing station, where a receipt is issued. negotiable at face value anywhere in American Samoa, is issued, generally in the name of the family chief. The product is then stored in a copra shed to await transportation to Pago Pago. (See plate 2, 2.)

The government markets the copra and thereby saves the Samoan from trading with people whose ways he does not understand, and, by selling it on contract, gets a better average price over a period of years than could be gained by individuals. An American navigation company gives a special freight rate to San Francisco.

Most of the coconut trees are about 80 years old, past the age of most productive bearing. Thousands of trees are deeply notched to enable climbers to obtain nuts and screws for their own use. These notches form openings where rot begins, leaving places for the coconut beetle to work and for mosquitoes to breed.

The average annual amount of copra produced from 1922 to 1935 inclusive was 1,012 tons. The quantity produced is governed by the selling price. In 1928, 1,056,54 tons were produced; the market price was $99.56 a ton. In 1932, only 60-30 tons were made; in that year the average price was $31.77 a ton. Figure 5 shows the annual production and price per ton over an 18-year period. The following table gives data on copra production, price per ton, and income from it to American Samoa from 1901 to 1936. It is based on records in the Attorney General's office, Tutuila.
## Table 11.

<table>
<thead>
<tr>
<th>Year</th>
<th>Tons</th>
<th>Price per ton</th>
<th>Amount received</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>174.4</td>
<td>$43.46</td>
<td>$7,862.65</td>
</tr>
<tr>
<td>1902</td>
<td>390.4</td>
<td>62.42</td>
<td>23,751.94</td>
</tr>
<tr>
<td>1903</td>
<td>505.7</td>
<td>55.44</td>
<td>28,042.92</td>
</tr>
<tr>
<td>(hurricane year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1904</td>
<td>553.5</td>
<td>57.69</td>
<td>31,592.46</td>
</tr>
<tr>
<td>1905</td>
<td>1,146.1</td>
<td>57.50</td>
<td>65,797.78</td>
</tr>
<tr>
<td>1906</td>
<td>901.3</td>
<td>54.00</td>
<td>48,600.16</td>
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<td>1907</td>
<td>914.9</td>
<td>76.28</td>
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<td>1908</td>
<td>1,030.9</td>
<td>61.00</td>
<td>63,434.85</td>
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<tr>
<td>1909</td>
<td>1,047.1</td>
<td>63.23</td>
<td>66,228.59</td>
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<td>1910</td>
<td>1,224.9</td>
<td>80.00</td>
<td>97,988.86</td>
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<td>1911</td>
<td>1,506.3</td>
<td>87.62</td>
<td>124,452.53</td>
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<td>1912</td>
<td>1,525.7</td>
<td>93.75</td>
<td>142,031.86</td>
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<td>1913</td>
<td>791.6</td>
<td>100.25</td>
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<td>(hurricane year)</td>
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<tr>
<td>1914</td>
<td>1,138.8</td>
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<td>1915</td>
<td>726.9</td>
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<td></td>
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<tr>
<td>1916</td>
<td>865.3</td>
<td>108.66</td>
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<td>1917</td>
<td>1,195.8</td>
<td>103.52</td>
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<td>1918</td>
<td>1,369.3</td>
<td>136.52</td>
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<td>1919</td>
<td>720.8</td>
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<td>(hurricane year)</td>
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<td>1,302.10</td>
<td>71.21</td>
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<td>1,314.87</td>
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<td>1926</td>
<td>389.95</td>
<td>108.00</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1927</td>
<td>551.62</td>
<td>95.78</td>
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<td>1928</td>
<td>1,080.54</td>
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<td>167,911.92</td>
</tr>
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<td>1929</td>
<td>1,851.35</td>
<td>92.51</td>
<td>147,215.79</td>
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<tr>
<td>1930</td>
<td>1,619.04</td>
<td>83.49</td>
<td>135,327.94</td>
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<tr>
<td>1931</td>
<td>355.31</td>
<td>50.15</td>
<td>17,494.02</td>
</tr>
<tr>
<td>(hurricane year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1932 Jan.-June</td>
<td>167.91</td>
<td>33.00</td>
<td>5,541.03</td>
</tr>
<tr>
<td>1932 July-Dec.</td>
<td>434.39</td>
<td>30.55</td>
<td>13,248.89</td>
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<tr>
<td>1933</td>
<td>669.81</td>
<td>(No contract; on consignment)</td>
<td>16,088.64</td>
</tr>
<tr>
<td>1934</td>
<td>654.43</td>
<td>(No contract; on consignment)</td>
<td>17,099.03</td>
</tr>
<tr>
<td>1935</td>
<td>1,534.86</td>
<td>45.09</td>
<td>70,108.19</td>
</tr>
<tr>
<td>1935</td>
<td>710.17</td>
<td>48.35</td>
<td>35,139.17</td>
</tr>
<tr>
<td>(hurricane year)</td>
<td></td>
<td></td>
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</tr>
</tbody>
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TRADE ARTIFACTS

A growing sale for mats, upa, and other local products encouraged the Government to establish in 1933 a Board of Industry and a Department of Native Industries. Governor Landenberger (26) stated:

It is contemplated that this Board will meet from time to time and make such suggestions and recommendations as are possible and to give good advice to the Governor so that he may be enabled to proceed in an intelligent and sound manner and carry out an economic development plan for American Samoa that will bring much contentment and happiness to the Samoan people, and even prosperity if it is a success.

The artifacts are made in the homes and sold through the Department or directly to tourists when steamers call at Pago Pago. The making of native artifacts is described by Buck in "Samoan material culture" (5).

The income to Samoans through the Department of Native Industries is some $1,200.00 a month. It is estimated, conservatively, that the value of artifacts sold directly to tourists averages $1,500.00 a month. The total annual income from artifacts amounts, therefore, to some $32,400.90 a year.

The planting of paper mulberry trees and pandanus which provide raw materials is discussed on page 20. Woods from the forest are used to make baskets, miniature boats, "hula" skirts, and other products.

On the island of Aunu'u, mat-making is more important than the production of copra. Coconut trees have been cut down to make room for pandanus. The largest contiguous area which I saw used for pandanus was on Aunu'u—about 0.1 acre.
SOCIAL ORGANIZATION

It is appropriate at this point to discuss briefly a few features of Samoan society. The Samoan family is a communal unit; the members of which work together for the good of the whole group. Social pressure determines that each member conforms to a pattern which has been handed down from time immemorial. "Those who care greatly in love or friendship, who flout any social convention for a private, unsanctioned whim, are the social misfits in Samoa."

(Mead, 52, p. 84.)

Ceremony is important and takes up much time; it is uppermost in the thoughts of Samoans and first in their affections; it reaches a high degree of perfection in the kava ceremony.

Mead (32, pp. 52, 65) discusses daily life in Samoa as follows:

Daily life is peaceful. . . . no one is called to labor too diligently; all are fed and sheltered, and given opportunity to dance and make merry. No one lives below a comfortable subsistence level; all have sufficient food and clothing and shelter. . . . The old, the infirm, the blind, the sick, are easily provided for. Conditions (all the year in Samoa) approximate to those in a prosperous farming district (in the mainland of the United States) in summer, when the gardens are bearing and a few more months to seed make very little difference. In Samoa there is no winter, no dry season, no period when scrupling and saving are necessary.

It must be pointed out, however, that the climate of Samoa makes it a great hostler for bacteria. Skin diseases are rife, wounds heal slowly, and respiratory infections are common. The expectation of life of a healthy Samoan is considerably shorter than the expectation of life of a healthy citizen of the mainland United States.

The food, clothing, and shelter of Samoans have been described in detail elsewhere. Krammer (34) gives, in detail, methods of preparing Samoan foods and the materials used. Buck (5, pp. 98-140) discusses Samoan foods and cooking utensils.

A family chief generally insures that his family raises more food crops than it needs, as his prestige demands the giving away of food on ceremonial occasions. In Samoa, a man's social prestige is measured not by what he has, but by what he gives.

Clothing is scant, in accordance to the hot climate. A man wears a long kilt (fasaitau) folded about the waist; the upper part of his body is bare. Women wear kilts and tunics. Children run about naked. Shoes are never worn. Cotton has replaced barkcloth, which is now worn only on ceremonial occasions.

Men, women, and children live together in the same house—one room with no partitions. The sites (po'a) of the houses are of coconut leaves and are let down only in rainy and windy weather.
Like all primitive people, Samoans have a strong belief in the supernatural. They use charms (tau'a) or naturally enforced penalties to protect their plantations from thieves.

Samoans have received the Christian church ritual and ceremony into their culture and have altered the tenets so that they do not interfere in general with their old customs except with regard to observance of the Sabbath. They are strict Sabbatarians.

Church architecture is copied from the west, and the ventilation of the building is not all suited to their climate. The village of Asuu has a church, the materials and skilled labor for which cost $28,000.00. It was paid for by money from the sale of mats and copra.

The social organization of Samoans for work has a direct bearing on land utilization. The work of the men includes clearing the forest for taro plantations, planting taro and some of the other crops which Samoans raise. Young men also cook the meals for the family.

The young men's society (amaaga) of a village is responsible for the main agricultural work. That society on Tanu has a taro plantation of its own. Small divisions of it are worked by the members on days agreed upon.

When a village has a big supply of taro, it is chiefly to the credit of the young men. When there is a malo or ceremonial party of visitors in a village, the work of preparing food for the guests devolves upon the young men. They do much of the preparation for a village festival (fiafa).

Women generally plant pandans, paper mulberry, and sugar cane and canes for those crops. They weave mats, make barkcloth and screen and thatch for houses; they wash clothes, fetch water, and care for the children. The weeding of taro plantations is usually regarded as woman's work. Women share other kinds of work with the men, like fishing on the reef and carrying food from the plantations.

There is no daily routine of work in Samoas. Each day has its own schedule, which is not known until the morning or perhaps the evening before. Samoans rise before daylight and do their hard work before the sun is high. After their labor, they return to the village and have a light meal, then during the afternoon they rest—stretched on mats in their homes. The main meal of the day is eaten about sundown.

The family chef designates the work for the members of his group. He delegates one man to clear land for a new taro patch, another to fish, a third to cook; he tells the women to weave mats or to make thatch. Or he may decide that all the working members of his family will go to the taro lands on one day, or that all will fish on the reef. Deep-sea fishing frequently depends on the appearance of a school of fish off shore, thus fishing takes precedence. Bonito fishing was carried on only by certain families under the old law of Samoa.
and now by tradition it is carried on by the descendants of those families. Similarly, the trade of carpenter or house builder is confined to certain families (5).

Attributes of Samoan character can be traced to the environment in which his type of society has developed. A Samoan’s “knowing” things must be defined as a manner of reacting to his environment; his world is a small group of isolated islands where nature has been good to the native. The future does not enter into his calculations. In former years, Samoans stored breadfruit and bananas (wauta) in air-tight pits to be used in time of hurricane famine, but the modern Samoan dislikes storage food and prefers to lean on the Government in times of distress.

Methods of land utilization are not the best economic adjustment to the natural environment, but they have been adequate. They have involved no problem of note which has been forced upon the native attention. Everyone has been satisfied, and there has been no incentive to progress in the western sense of the word.

SALARIED NATIVES

There are several groups of natives in American Samoa who receive wages for government and private work. The Fifatia Guard is the moneyed class. It is made up of Samoans who have enlisted in the Navy, for duty in Samoa only. They receive the same rating and pay as American sailors, which is an amount of money far out of proportion to the native scale of living. However, their status has been established for more than 30 years and is not likely to be changed. In 1935, there were 80 members of the Fifatia Guard and 43 other natives in the reserve and retired class who received salaries (31, p. 5).

In the Department of Education there are 55 natives. Samoans are also employed in the Supply Department of the Government, in the Department of Public Works, and in the Department of Customs. Women are employed as nurses by the Medical Department, and men and women work as cooks and servants for the white people. Native district governors, county chiefs, village mayors (palenu’a), judges, and policemen also receive salaries. They are individuals chosen by the Government with the aid of the local populace to help administer island affairs. There were, in 1937, 440 native employees who received salaries. Probably one quarter of them were Samoans of mixed blood. In 1935, salaries amounted to $210,728.57 (31, p. 5).

Most of the above-mentioned salaries are from taxes raised in the United States; but native officials, school teachers, copy clerks, and some others receive their salaries from taxes raised in American Samoa by the sale of copra and native artifacts.

McTaggart made a survey to determine what proportion of a Samoan’s wages is used by the earner. He writes as follows (31, p. 23):
After talking to 25 of the teachers, 15 members of the Fina Fita Guard, and 15 workers on the Naval Station proper, the writer determined that an individual who receives a monthly salary gets to use only 50 per cent of that salary for his immediate family (biological family in the American sense of the word). The other 50 per cent has to be turned over to relatives for their use. Requests are made of them and to refuse would mean ostracism and loss of "face." Therefore help is never refused. This conception of family membership (also) is entirely foreign to the American outlook, but it means everything in Samoa; in fact it is Samoa.

FACTORS IN CHANGE IN SAMOA

During 37 years of government by white people, certain changes have been coming to American Samoa of which the native is scarcely aware; some of them are beyond his comprehension.

INCREASE IN POPULATION

The next significant change is the increase in population (Fig. 6). When the American government accepted the cession of the islands in 1900, the population was 5,679. In 1937, it was 11,906. The figures for 1919 and 1927 (table 9) include 99 and 125 for Swains Island. Figure 6 shows the growth of population from 1900 to 1937. It is unlikely that all deaths were reported prior to 1928, as before that year the Department of Public Health did not take an active part in the collection of mortality statistics, and causes of death were not registered (19, p. 105).

![Figure 6: Growth of population in American Samoa 1900-1937.](image)

The following table gives the statistics of population at wide intervals in early years and annually in recent years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
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</thead>
<tbody>
<tr>
<td>1900</td>
<td>5,679</td>
</tr>
<tr>
<td>1927</td>
<td>11,906</td>
</tr>
<tr>
<td>1937</td>
<td>11,906</td>
</tr>
</tbody>
</table>

The data shows a significant increase in population over the years, with the highest recorded in 1937.
### Table 12.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Swains Is. population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>5,679</td>
<td>no report</td>
</tr>
<tr>
<td>1912</td>
<td>7,251</td>
<td>&quot;</td>
</tr>
<tr>
<td>1920</td>
<td>8,056</td>
<td>&quot;</td>
</tr>
<tr>
<td>1922</td>
<td>8,183</td>
<td>&quot;</td>
</tr>
<tr>
<td>1930</td>
<td>10,055</td>
<td>99</td>
</tr>
<tr>
<td>1931</td>
<td>10,187</td>
<td>88</td>
</tr>
<tr>
<td>1932</td>
<td>10,562</td>
<td>92</td>
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<tr>
<td>1933</td>
<td>10,843</td>
<td>94</td>
</tr>
<tr>
<td>1934</td>
<td>11,331</td>
<td>111</td>
</tr>
<tr>
<td>1935</td>
<td>11,313</td>
<td>94</td>
</tr>
<tr>
<td>1936</td>
<td>11,613</td>
<td>no report</td>
</tr>
<tr>
<td>1937</td>
<td>11,781</td>
<td>125</td>
</tr>
</tbody>
</table>

Figure 7 shows the distribution of population of American Samoans in 1935.

The increase in population is due in part to the fact that a western government established an era of peace in the islands. A much more important factor in the increase is the establishment of a regime of medical service and sanitation, the extent of which, in view of the small number of the total population, is scarcely to be found elsewhere among a native people.

The Department of Public Health in American Samoa was established in 1914 (30, p. 66). Its personnel is composed of the medical officers and enlisted men of the United States Navy attached to the naval station and a group of Samoans trained by them. There are medical officers, a dental officer, pharmacist mates, sanitary inspectors, seamen, and Samoan nurses organized into a department consistent with the high degree of organization of the Navy. Medical service is entirely free. In short, the thing which Samoans need most is being supplied by the government.

The increase in population has made the occurrence of hurricanes more significant in that there are more mouths to feed now than formerly. The following account of the effect on Ta'u of the hurricane of 1915 is taken from the senior medical officer's official report (39):

The first impression one received on approaching the devastated islands from the sea was the marked change in color of the general landscape. In the place of the usual intense tropical green of the luxuriant foliage, the whole country appeared scar and brown. The hillocks were covered with fallen timber and debris, which suggested strongly the savages of a forest fire, such as one frequently sees on the hills of devastated timber tracts. Not the slightest vestige of green vegetation was to be seen anywhere, the entire scene being that of a desolate waste.

The effect of the 1915 storm was felt most in the Manua District. The Congress of the United States appropriated $10,000 for the relief of the people of the Manua Islands after the hurricane.
In 1926, the Navy Department sent 50 tons of rice, 10 tons of salmon, and 15 tons of biscuit to relieve sufferers from a hurricane famine. Authority was also given to draw navy stores and material for purposes incident to the hurricane. After the hurricane of 1926 Swains Island had a shortage of food (3).

As a result of the relief from outside the islands, the Samoans were very slow in planting and slower still in making any attempt to clean their plantations. Every village wanted free food, whether it needed it or not. Few chiefs made any attempt to withstand the pressure of the natives to get all they could from the government (30, p. 4).

**Education**

Another factor in change in American Samoa is education. The objective adopted in this endeavor is that of using "public education as a means of building within the race an understanding of Samoan problems and of Occidental culture to the end that Samoans may choose intelligently for themselves what they shall go, what they will retain from their own culture and what they will adopt from the others" (32, p. 342). Alexander (1, p. 345) says: "Samoan social organization and practices will change; this change should be brought about by the Samoans themselves. . . . Our duty to primitive man is not to superimpose, neither is it to deny; our best service to him consists in helping him to help himself."

In the educational program considerable emphasis is placed on agriculture and the best methods of land utilization. This is indeed an important part of a young Samoan's education. Changes in land utilization will be concomitants of change in the native social system. It will be almost impossible to change the ideas of the older people; new ideas will be inculcated in the young very slowly and gradually.

The head of the present government has doubts about giving an academic education to the natives (33).

Some attention has been given to changing the aspect of agriculture in American Samoa. A Department of Agriculture was organized in October 1932, among other things "for the purpose of introducing new trees and field crops, additional root crops and useful hardwood trees" (1). It is in charge of the radio officer of the Naval Station whose efforts in that field are devoted almost exclusively to operating a Government Experimental Farm. The farm, however, is established on flat ground where there is a deep sily soil, and results obtained do not apply to Samoa in general. Furthermore, the emphasis is put on raising crops new to Samoa—tomatoes, beans, carrots and the like—for which the Samoans have no use.

More success would likely be gained by devoting attention to taro. Under present conditions the second crop of taro is smaller than the first, and the third is so small that the Samoans do not raise a fourth. Evidently the taro is taking
away some important element from the soil necessary for its growth—probably nitrogene. If the ingredient were replaced in the soil, probably the third crop of taro would be as large as the first. The rain fall is so heavy that the organic matter is quickly leached from the soil—although it is large in an area just cleared. If ammonium sulphate or sodium nitrate were put in the soil, it would probably be rejuvenated. Sugar planters in Hawaii have been raising sugar cane for 60 years continuously on the same soil by fertilizing with sodium nitrate, and the soil in Samoa is of similar origin to that in Hawaii. The Samoans in the present state of their economic development cannot afford to fertilize their soil.

Since the Samoan has been carrying on his methods of agriculture for hundreds of years before the United States was discovered and in a part of the world where the natural environment is entirely different, he finds it very difficult to follow advice from Americans. He accepts suggestions sympathetically and courteously, however.

The school system uses English as the medium of all instruction, thus increasing the difficulty of learning subject matter. Justifications for the insistence on English are chiefly these two: first, to acquire that knowledge of the world considered necessary for education, English must be acquired because all the books which must be read are written in English; second, the Samoan must have a command of English to deal effectively with people of western culture, in commercial, legal, and other contacts.

The economic and human geographer looks at the situation this way: contacts with western culture if intensified by a good knowledge of English will result in an increase of economic desires, an increase far greater than the economic resources of the islands can ever satisfy. The sociologist sees in compulsory English the possibility of a complete breakdown in native culture. Most sociologists agree that language is an integral part of culture, and that if the language is lost or debased other important aspects of the culture will disappear. In Samoa, the importance of language in culture is particularly obvious, both to the casual observer and to the careful student. The disintegration will be heightened by the chasm created between the old generation and the new. Possibly the loss of language alone could be overcome by other factors of social integration, but when the loss of language is added to other factors causing social disintegration, the results may be disastrous.

Mention here may be made of the Peleliu School, a boarding school for boys, situated near Taputapuau on the island of Tutuila. It is maintained by the Frederick DuBois Barlowe foundation for American Samoans. (I stayed for three weeks at the school as guest of the headmaster and his wife.) The school was opened in 1934 with the purpose of training the sons of chiefs for leadership. Instruction is bilingual, and teaching is based on the principle that the Samoan
culture of the future will be fundamentally the traditional native culture, but
that, to face changing conditions, it will be modified by cultural elements intro-
duced from the West. The school is experimental in nature and is not a part of
the government school system.

Samoa is in a quandary regarding how much of the foreign culture they
should exchange for their own. Since most of them know very little of the for-
ign culture, they are worried regarding what effect certain aspects of it may
have on their own institutions.

Western Contacts

An important factor in change is contact with the white people. Such con-
tacts are restricted almost exclusively to the Pago Pago Bay area. There one
sees a few Samoans living in houses constructed of American materials in
American style, and various hybrid architectural structures. A native Pomare
expressed to me his feeling about the situation in this way (15):

The white people have come to Samoa and brought things and ideas which the
people like. They wear trousers, but it is not good for our people to wear trousers;
they are too hot. So we do not allow the boys in our school to wear trousers. The
white people have caused meat and our people like it, and some eat a lot of it, and it is
not good for them. Our people have got lazy now about going fishing.

The Samoans about Pago Pago are supported in part by a commercial econ-
omy. There is a lively little trade in taro, bananas and other products from out-
lying villages (pl. 2, C), and considerable dependence on imported foodstuffs.

There are few contacts with the white people away from Pago Pago Bay.
Outside that area there are only two permanent white residents in American
Samoa, one in Leone and one on Swains Island. Such restricted contacts will
result in a slow change of ideas. The government has constructed some 35
miles of secondary roads in Tutuila and these help to disseminate the western-
tized ideas of natives about Pago Pago Bay. Buses run between villages and
the Naval Station. Many come on steamer days to sell their wares to tourists.

The Future

The present Samoan background is one to which the natives have gradually
adjusted themselves and one in which they derive the greatest happiness.
Changes have occurred, however, and they will continue to come. Changes that
may be thought beneficial should be gradually effected in order that they may
be properly assimilated into Samoan culture without abruptly changing their
social order. Unless unforeseen circumstances pour a large white population
into American Samoa, the native background will continue for generations to
come, with adjustments now and then to absorb cultural elements that infiltrate from the world outside.

For several generations to come the coconut will probably be the most reliable source of revenue in American Samoa, as it has been in the past. Coconut oil or copra has been exported from the islands for 100 years (46, pp. 109, 278). It is difficult to state whether the market for native artifacts will be permanent.

Governor Lincoln of American Samoa in his Annual Report in 1931 stated (27): "After 30 years of occupation . . . agriculture is little better than 30 years ago." It is my opinion that 30 years from now agriculture will be little different from that of today. Increase in population will probably bring into use a little more land from the natural forest; the land at present cultivated may be used a little more intensively, some of it prepared in part with hoes and spades.

Three small demonstration farms, one in each district would be better than the present experimental farm. Samoans could be shown how to improve on their own ways of doing things.

A quarantine should be imposed on all agricultural plants introduced into the islands. Some pests which have proved difficult in the Territory of Hawaii, for example, are lantana, guava, carpet grass, and cockle burr (44).

Poultry could be much improved by the introduction of some good roosters.

Any attempt to improve methods of land utilization must take into consideration the communal organization of the Samoan family. Under the present social system, one which could be changed only gradually over a long period of years, the native is fed, housed, and clothed, allowed to live his happy life according to the custom of his people; in time of trouble his chief and his family will stand by him.

ROSE ISLAND

Rose Island is visited once a year by a government representative from the Naval Station at Tutuila. As I have stated, the island is uninhabited. It is the most southerly of the islands of the Samoan archipelago, about 80 miles from Tau Island in the Manua group. It is one of the smaller isolated atolls in the Pacific Ocean.

Sethell states (42, p. 247):

The coconut palm exists on Rose Island only as it has been planted. So far as may be determined, plantings were made about or somewhat before 1879 by the German proprietors of a fishing station on the island, and these thrive sufficiently to produce fruit and in sufficient abundance to induce one of the natives employed in this work to remain after the project had been abandoned and to keep his family with him. It is inconceivable that a native family would remain in such an isolated and desolate island as Rose Island unless there were at least a few coconut trees.
Other plants growing on the atoll are described by Satchell (42, pp. 247-259).

SWAINS ISLAND

The following are excerpts from a mimeographed report on Swains Island in the files of the government of American Samoa (43, pp. 113-118). The report is based on a visit to the island on May 22, 1934.

The main village and other parts of the island were found to be exceptionally clean. The water supply is rain water. The writer . . . was struck by the unusual use of coconut husks and other refuse. This refuse is carefully collected and stacked around the roots of the banana trees. In addition to retaining moisture around these plants, this serves the useful purpose of keeping the village and beaches clean.

The usual communal life . . . is present. In addition, the interesting group of laborers imported from various islands is present. Of this group 20 are men and 18 women. They come to Swains, remain during their period of satisfactory service and leave when they no longer desire to remain. . . . [Swains Island is owned by Mr. Jennings, a three-quarter Samoan, and run by a German overseer.]

Work is divided in a most interesting manner. A portion of the laborers are constantly engaged in the various tasks necessary to run a coconut plantation of some 20,000 trees, 15,000 of which are bearing, and produced 120 tons of copra last year—almost the sole source of income to the island. The men are detailed in turn under the instruction of the most skillful fishermen present to engage in fishing for the daily needs of the island. . . . The surplus fish is dried, or salted. Mr. Jennings has reported that if transportation were available he would be able to earn considerable money by catching and drying the fish for export.

Hogs and pigs to the extent of 200 animals were reported on this island. While the writer made no count, this appears to be a very liberal estimate.

While the poultry nominally belongs to the owner of the island, it was noted that many chickens were tied to various fale (houses). Several of these hens were brooding flocks of young chickens.

Mats are made from the leaf of the pandanus plant . . . A hat, resembling the Panama hat, is manufactured from the native grass. Some crude specimens of wood carving were observed. Naturally many work implements are manufactured from crude materials.

The present population of Swain's Island is one hundred and eleven (111) . . . It is interesting to note that there are thirty-five (35) persons from the Tokelau Islands.

A yearly supply of medical stores . . . was delivered. Mr. Jennings reports that the barium carbonate delivered last year greatly reduced the rat population. . . . In former years it was estimated that 20 per cent of the coconut crop was damaged by the ravages of rats.
Coulter—Land Utilization in American Samoa

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A. TYPICAL SAMOAN SCENE; B. SAMOAN PLANTING YARO WITH HIS DIGGING STICK (TASI); C. YARO GROWING ON MOUNTAINSIDE ABOVE FANGATA (PHOTOGRAPHS BY J. W. COULTER).
A. SADOAN CLIMBING LAND FOR YARO, SLOPE OF ABOUT 45 DEGREES, ABOVE FAGANOKE. B. NATIVES PREPARING TO LOAD COPRA AT ATUPAPA. C. SADOAN SELLING BANANAS AND OTHER AGRICULTURAL PRODUCTS ON VILLAGE GREEN AT NAVAL STATION, Pago Pago Bay. (Photographs by J. W. CULLEN.)