



TRANSACTIONS
OF THE
ROYAL HAWAIIAN
AGRICULTURAL SOCIETY

AT ITS
SIXTH ANNUAL MEETING,

JULY, 1856.

VOL. 2, NO. 3.

HONOLULU, H. I.:
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LIST OF OFFICERS FOR 1856.

JAMES F. B. MARSHALL, *President.*

BENJ. PITMAN, Hawaii,
- P. CUMINGS, " } *Vice Presidents.*
- L. L. TORBERT, Maui,
SAML. G. DWIGHT, Molokai,
H. A. WIDEMANN, Kauai, }

GEORGE WILLIAMS, *Treasurer.*

WILLIAM HILLEBRAND, *Corresponding Secretary.*

E. O. HALL, *Recording Secretary.*

J. H. WOOD,
- WM. WEBSTER,
C. R. BISHOP, } *Executive Committee.*
- A. B. BATES,
- M. C. MONSARRAT, }

ANNUAL MEETING
OF THE
R. H. AGRICULTURAL SOCIETY.

HONOLULU, July 29, 1856.

The Society met at the Court House at 11 o'clock A. M., which was the time appointed for the Annual Meeting by the Board of Managers.

The President of the Society, J. F. B. Marshall, Esq., took the Chair and called the meeting to order; and in conformity with the Constitution, read his report for the past year, which was accepted, and is as follows:

Gentlemen of the Royal Hawaiian Agricultural Society:

It is rendered my duty under our Constitution to make the Annual Report of the state of our Society, its transactions and its prospects.

At our last Annual Meeting the Hon. Wm. L. Lee, at that time our esteemed and efficient President, was absent on a mission to the United States, which had for its principal object the negotiation of a Treaty of Reciprocity that should relieve us of the heavy duties now imposed on some of our principal productions, and thus give a much needed stimulus to Hawaiian agriculture.

As you are already aware, that mission was eminently successful, and the treaty now only awaits the action of the United States Senate to go into effect. I am assured by Mr. Lee that the treaty will without doubt be ratified by the Senate. It is hoped and believed that its operation will attract foreign capital to our shores, which, by developing more fully the agricultural resources of the Islands, shall create a large export, and thus raise this nation from its present torpid condition to a state of comparative prosperity.

The past year has been one of almost unprecedented financial embarrassment in this community, and though the commercial interests

have been the most seriously affected, yet the agricultural interests have also heavily suffered.

The great depreciation in the prices of improved real estate, both in town and country, is an indication that the evil is deeply seated and will not speedily be removed. Our Society has felt in no slight degree the benumbing influence of the general depression; and we meet to-day under circumstances of great discouragement, and with prospects dimmed and clouded.

From various causes we have been deprived of the counsel and aid of several of our earliest and most efficient members; and in a small community like this, the loss of even one advocate is seriously felt. The Hon. W. L. Lee, who may be termed the founder of this Society, who was for five years its President, and was energetic and untiring in his efforts in its behalf, is now prevented by confirmed ill health from aiding us with his counsel and his presence. God grant that such a measure of health at least may be restored to him as will enable him to continue his valuable labors in this community, for I know that without the ability to be useful to his fellow men, life itself will become a burden to him.

Another of our first members and zealous supporters has been taken from us. Stephen Reynolds, Esq., one of our oldest residents, and who was long one of our wealthiest citizens, driven to the verge of bankruptcy by pecuniary embarrassments, has become a lunatic: His charities were ample; and many have found in him a "friend in need." We can only hope for his speedy restoration.

Others of our most efficient members have been compelled by pecuniary difficulties to give up agricultural pursuits, and abandon their "hard fought fields," at enormous sacrifices, to seek some more remunerative occupation. (The sugar plantation of Mr. Reynolds on Maui, on which he had expended nearly seventy thousand dollars, has been sold for seventeen thousand dollars;) the fine plantation of L. L. Torbert, Esq., on Maui, on which so much capital and labor had been expended, was forced off at auction at a proportionate sacrifice. The coffee estate of G. Rhodes & Co., on Kauai has also been sold at a great loss.

The great loss at which these estates have been sold does not arise

from any falling off in the profits of the business, for I consider that the prospects of sugar and coffee planters were never better than now, but from the great lack of capital to purchase such estates. The estates themselves were embarrassed by heavy debts, the interest of which swallowed up all the profits. They are now owned by men of capital, who can hardly fail to reap large returns for their investments.

The Hawaiian Steam Flour Company has also been compelled to sell out at a loss to a new company, who are carrying on the business with vigor and with good prospects. The flour now manufactured is of superior quality and commands a ready sale. I consider this enterprise of great importance, and hope it will be sustained. Wheat can be raised by the natives without difficulty, and if the manufacture of flour can be made profitable, a sure source of profit is thus opened both to the native and foreign population of the rural districts suitable to wheat raising. At present all our wheat is raised on East Maui, but it is believed that there are lands on Hawaii equally well adapted to this grain, and the company are taking measures to extend its cultivation.

I think that a close examination of the history of sugar, coffee and wheat growing at these Islands, will show that they can and will be made profitable. The instances of failure, which have been but too numerous, and which have brought such enterprises into disfavor, if examined into will be found to have been caused either by the choice of unsuitable localities, mismanagement, or lack of capital. If, instead of being discouraged by such failures, we make use of the lessons which they furnish, and avoid the errors which caused them, I think the future will show that success will prove to be the rule rather than, as heretofore, the exception.

The Board of Managers, during the past year, has made several attempts to introduce insectivorous birds, but thus far without success. I have strong hopes, however, that Mr. Burtlet, the Deputy Collector of this port, who is now absent on a voyage to Oregon, will succeed in procuring some of these very desirable immigrants. The Board furnished him with funds for this purpose, and authorized him to incur any additional expense necessary to accomplish the object. We have

also sent funds to Australia, through the kindness of Dr Hillebrand, whose correspondent, Ferd. Mueller, Esq., is now one of our own corresponding members, for the purchase of certain desirable plants and seeds, but the *Vaquero*, by which vessel they were sent, has not yet returned. From San Francisco, we have imported peach and apricot trees, which have been distributed through the group and are doing well.

Through the kindness of R. J. Hollingsworth, Esq., formerly a member of this Society, but now a resident of Calcutta, we have received from that place quite a variety of new seeds of ornamental shrubs and trees, which have also been scattered over the group, and many of which are thriving. A list of them will be published among the Transactions.

I have made several applications at the office of the Minister of the Interior for permission to select the fifty acres of land, that were devoted some years since by a law passed for that purpose, to the use of the Agricultural Society for the purpose of a nursery; but owing to the non-completion of all the surveys, the land has not till now been ready for selection.

I regret to state that on the 4th July last, during the absence of the Treasurer from his room, the uninvested fund of the Society in his charge, amounting to \$820, were stolen from a bureau-drawer in which they were kept. Mr. Williams voluntarily assumed the loss and gave security for its repayment. The Board of Managers, not feeling authorized to release him from the responsibility of a loss occasioned by his want of care in not placing the fund in a secure place of deposit, accepted his securities. The loss, however, is a heavy one for Mr. Williams to bear, and though he does not seek to be released, still it is a proper question for your consideration, whether he shall be held accountable for the amount. This fund was to be devoted to the payment of premiums awarded at this Exhibition, and other outlays and current expenses, for which purpose it will now be necessary to encroach on the permanent fund of the Society.

I wish to say a word in reference to this "permanent fund," as some have thought it unwise to let it accumulate, thinking it should be expended in the introduction of new stock, etc. The Government, as

I have already stated, have allotted to the Society fifty acres of land, which are now ready for selection, for the purpose of a public nursery, in which rare and desirable plants and trees could be propagated for distribution, and in which experiments could be tried, at the expense of the Society, that might prove of benefit to the planter, farmer and gardener. To make such a use of this land we need the means to enclose and clear it, and if possible to build a suitable dwelling house for the use of the superintendent. We must also have the means to pay the laborers employed, as even if the nursery should eventually pay its way, it would not be for one or two years. This is one great reason why it is desirable to create a permanent fund. Another reason is that even if the fund were not to be employed for the above purpose, still it is very desirable to have an income in addition to what is raised by subscription, fees, or the government donation, that shall increase our means of usefulness.

I have not heard of any new plantations being commenced. The great wants of labor and capital still operate to prevent any new enterprises of this nature. The manufacture of cigars has been commenced at Koloa, Kauai, by Mr. J. R. Opitz. Mr. H. A. Widemann, of Grove Farm, Kauai, has commenced the manufacture of kukui oil, and has produced a very superior article, which Mr. Archer, in his report from that island, considers to be very excellent for burning, second only to the best sperm oil. As the article is sold in Honolulu at one dollar per gallon, one-half the price of sperm oil, if it proves to be equal to Mr. Archer's opinion, it will doubtless command a ready sale, and be a valuable production. It is also an excellent paint oil. I would refer you to the samples of kukui oil, which will be exhibited by Dr. Frick, as specimens of what can be produced from this valuable nut.

The manufacture of soap has been commenced by Messrs. M. R. Packer & Co., who seem determined to triumph over every obstacle to success. The soap made by them, owing to the cheapness of tallow and some other ingredients used in its manufacture, is said to be superior to any imported soap. Success to all such enterprises. They add to the wealth of the country and should be encouraged.

Our Society has now reached the seventh year of its existence. It

is well to inquire if its present organization and system has proved to be the one best adapted to secure and promote the great objects for which it was instituted; in what respects it has failed to answer the purpose, and what have been the obstacles that have caused such failure.

To my mind it is clear that the great and, at present, almost insurmountable obstacle to the complete success of the Society, is the isolation of the agriculturists from each other and the difficulty of communication, especially with Honolulu, the head-quarters of the Society. "Lands intersected by a narrow frith abhor each other," and though here the lands are on good terms enough, yet we all without exception abhor the "narrow frith." Our plantations, and with but few exceptions, our farms are all on the islands of Maui, Hawaii and Kauai, and in the channels between those islands and Oahu rolls the roughest sea to be found in the Pacific. In the absence of steam navigation, it is too much to expect of the agriculturists on those Islands, that they shall come up to our exhibitions with their produce, which may be spoiled before it reaches Honolulu, and at a loss of time which they can ill afford. Still less can we expect them to trust valuable stock to the mercy of the winds and waves. Nor can we wonder that when they come themselves, and see articles of produce and stock, of a quality much inferior to their own, receiving valuable premiums merely because the exhibitor's location is convenient to the place of exhibition, that they should feel dissatisfied and lose interest in the Society. Nor, from the above reasons, is it to be wondered at that the exhibitions of the Society are meagre, and not by any means a fair exhibit either of the capabilities of the Islands, or even of their actual productions.

I rejoice to know that the Government have at last determined to provide a suitable steamer for inter-island navigation; but one vessel will not remedy this difficulty.

For the above and other reasons it seems to me highly desirable that we give up, *for the present*, not only the annual exhibition, but the system of expending large amounts for premiums of plate, etc. As I have shown, and as experience has fully proved, the result is that the same parties, year after year, carry away most of the prizes,

which lose their value, while other members from living on other islands cannot compete for them. Unless all the members of the Society can enter the lists on terms of comparative equality, competition is destroyed, our exhibitions lose their interest, and dissatisfaction is created.

The Board of Managers are authorized by the Constitution to grant premiums, and I would propose for your consideration, in view of the above facts, that the annual exhibition and premiums be for the present suspended; that the Board of Managers grant premiums to meritorious producers from time to time, as they may deem advisable on satisfactory proof of merit being shown; that such premiums shall consist not of plate, but of superior implements imported with the premium fund for that purpose, or of books, money, or the Society's medal, at the option of the party; that the most of the premium fund and other available funds of the Society be used in importing more largely than heretofore, stock, seeds, plants and implements to be disposed of at cost, or in such manner as shall seem best to the Board. For instance, a meritorious producer or grazier, whether on this or other islands, might have the use, for a limited time, of the Society's imported stock to cross with his own animals. By these means I think the funds of the Society might be employed to more advantage than at present, and its usefulness and popularity much increased. It would be highly desirable that the Society should have a room in Honolulu as its head-quarters, where the members could have access to the books and periodicals of the Society, and where specimens of what are, and what might be produced here, could be exhibited. The Society has several books and receives agricultural periodicals which are now inaccessible from its having no public place of deposit.

When our Society was first organized it was proposed to create native auxiliary societies, and committees on each island were appointed for this object; owing however to the apathy of the people, and the difficulty of communication also, nothing in this way was accomplished. His Majesty, however, with a desire to awaken industrious habits and promote agriculture among his people that does him great honor, has taken the lead in the formation of the National Agricultural Society, of which he is the President, from which we hope

good results. The new society has our most cordial wishes for its success. Our objects and our interests are identical, and if the united efforts and wishes of the two societies can be crowned with success, a brighter day will dawn on Hawaii than any that has yet been seen in its history.

The Treasurer, Mr. George Williams, read his Report, which is as follows:

Mr. President and Gentlemen of the R. H. Agricultural Society:

For the third time it becomes my duty as Treasurer to lay before you a statement of the financial concerns of the Society, and, although it may not be as encouraging as those of former years, I think it will show that we have made some progress, notwithstanding the coldness and indifference of many of our old members.

There has been a great decrease the past year in the number of subscribers, which may, I think, be ascribed to the very poor exhibition of last year. If agriculturists generally would show a deeper interest in our exhibitions, and use greater exertions to make them attractive, the Society would meet with a ready support from all other classes of the community, and would soon become a really useful and flourishing association.

Leaving speculation, I must now touch on a very disagreeable reality. On the night of the 4th of July, while at the ball given at the Court House, my apartments were entered and robbed of \$820 belonging to the Society. As yet no trace has been discovered of the thief. For this sum I have given my note, with a responsible endorser—believing that the loss should be mine, heavy as it may be upon me; and I shall feel in a measure compensated for the loss if my action in the matter meets with your approval.

The receipts and disbursements have been as follows:

RECEIPTS.

Cash on hand from last year,	- - - - -	\$529 49
“ returned overpaid for medals,	- - - - -	22 00
“ received from Fair,	- - - - -	185 53
“ “ “ Hawaiian Treasury,	- - - - -	500 00
“ “ “ sale of Peach Trees,	- - - - -	105 13
Interest on note and mortgage,	- - - - -	120 00
Three pairs sheep shears,	- - - - -	8 75
Loan of cash returned,	- - - - -	2,000 00
Interest on loan,	- - - - -	120 00
Sale of “ Transactions,”	- - - - -	4 50
Interest on note and mortgage,	- - - - -	156 00
Seventy-one Annual Members.	- - - - -	355 00
		<hr/>
		\$4,051 40

DISBURSEMENTS.

Paid Cash Premiums,	- - - - -	\$80 00
“ expenses of Fair,	- - - - -	71 29
Certificates of Membership to auctioneers and three others,	- - - - -	25 00
Forwarded to Melbourne for Seeds, etc.,	- - - - -	50 00
“ United States for Premiums,	- - - - -	230 00
“ California for Peach Trees,	- - - - -	100 00
Paid Cash Premiums,	- - - - -	40 00
“ for printing “ Transactions,”	- - - - -	223 00
“ for binding, “	- - - - -	25 00
“ for envelopes,	- - - - -	4 00
Forwarded to California for Birds,	- - - - -	50 00
Loaned on note and mortgage,	- - - - -	2,000 00
Paid for recording “	- - - - -	3 00
Gave a note to the President,	- - - - -	820 00
Paid postage on “ Transaction,”	- - - - -	3 60
“ for envelopes,	- - - - -	2 50
Balance on hand,	- - - - -	324 01
		<hr/>
		\$4,051 40

The invested funds now amount to \$4,120.

Respectfully submitted.

GEO. WILLIAMS, *Treasurer.*

In view of the facts in relation to the loss of the \$820 mentioned in the above report, and the satisfactory manner in which Mr. Williams has assumed the responsibility and offered to secure the payment of the money stolen, it was

Resolved, That Mr. Williams be released from his responsibility in relation to the stolen funds; and it was further

Resolved, That uninvested funds in future be deposited in some secure place, at the direction of the Board of Managers.

The reading of reports of standing Committees being in order, some considerable time was thus occupied, when, on motion, their reading was suspended, and the Society took up the consideration of the suggestions of the President in his report relating to the suspension of annual fairs, and the general expenditure of funds for premiums. A long discussion ensued, and various suggestions were made in regard to supplying plants and seeds for the use of agriculturists, whereupon it was

Resolved, That the suggestions of the President be recommended to the favorable consideration of the Board of Managers, and that they be empowered to carry out those views at their best discretion.

The choice of Judges for the Fair on the 30th, resulted in the selection of the following, viz:

ON CATTLE.—Messrs. Judd, F. Manini and Harder.

ON HORSES.—Messrs. Monsarrat, Armstrong, Waterman.

ON SHEEP AND SWINE.—Messrs. Prendergast, Goodale, P. G. Gulick.

ON EGGS AND POULTRY.—Messrs. J. Ladd, Whitney, Sparks.

ON DAIRY.—Messrs. Savidge, Moffit, Pitman.

ON SYRUP AND SUGAR.—Messrs. G. Rhodes, G. A. Lathrop, Weston.

ON GRAINS AND CROPS.—Messrs. J. H. Wood, Armstrong, Hayden.

ON COFFEE.—Messrs. Bishop, Pitman, G. Rhodes.

ON VEGETABLES AND FRUITS.—Messrs. Holstein, J. H. Wood, E. Hoffmann.

ON FLOWERS.—T. Brown, Wm. Fell, Dr. Guillou.

ON FARM IMPLEMENTS AND DOMESTIC MANUFACTURES.—Messrs. Aldrich, Reiners, Howland.

ON MISCELLANEOUS ARTICLES.—Messrs. Wyllie, Gregg, Melchers.

ON EMBROIDERY AND ORNAMENTAL WORK.—Messrs. J. Ladd, Moll, Whitney.

The following officers were next elected for the ensuing year:

President—Jas. F. B. Marshall.

Vice Presidents—B. Pitman, }
 P. Cummings, } Hawaii.
 L. L. Torbert, Maui.
 R. W. Wood, Oahu.
 H. A. Widemann, Kauai.
 S. G. Dwight, Molokai.

Corresponding Secretary—Wm. Hillebrand.

Recording Secretary—E. O. Hall.

Treasurer—Geo. Williams.

Executive Committee—J. H. Wood, Wm. Webster, C. R. Bishop,
 A. B. Bates, M. C. Monsarrat.

Adjourned to the Bethel at half-past 7 this evening, and until Thursday morning, at 10 o'clock, for business, at the Court House.

At half-past seven, P. M., the Society met at the Bethel. After singing by a select choir, Dr. Wm. Hillebrand was introduced by the President, who delivered the annual address which follows below:

Mr. President and Gentlemen of the R. H. A. Society:

It has been customary at the anniversary meetings of our Society hitherto, to pronounce an unremitting eulogy on the calling which unites us here, and from which our Society has borrowed its name. Permit me, for once, to strike in a different line and to abuse it. To abuse it? I hear you say: but then you are out of place! You ought not to have appeared here! Allow me to correct myself by saying, to abuse its *abuse*—to restrain it within its proper limits.

What is the object of agriculture? Why, to feed and clothe man; to still his hunger and thirst; to protect him from cold and heat, from rain and wind. To supply his wants, and procure his ease, this self-styled lord of creation goes to work without hesitation or scruple to remodel the features of nature, which an all-loving Providence had arranged so as to offer the means of existence to every one of its created beings, from the humblest moss and insect upwards to the

highest developed animal. As if there were nothing worth existing beside him, he exterminates what does not administer to his wants or gratify his senses. Noble forests fall groaning under the relentless ax of the pioneer; myriads of modest little plants and weeds disappear under the burrowing edge of the ploughshare, to be replaced by a few kinds of social grasses called cereals, and some other plants and trees, from which he is accustomed to draw his sustenance. The aurox and buffalo, the elk and dam retreat to make room for the cow, the horse and sheep. So fully is he impressed with the propriety of his doings, that even his language outlaws by the opprobrious epithets of weed and vermin whatever poor being, with its innate instinct of self-preservation, interferes with the accomplishment of his preconceived mission. Where before forest and glade, swamp, meadow, lake, heath and river alternated in charming variety, now appears the level monotony of waving corn-fields or uniform pasture ground. Swamps are dried, lakes drained, rivers narrowed in their beds; the noble forest only finds a refuge on the inaccessible mountains, and with them flee away from the settlements of man, or disappear under his tramp, the lilly of the fields, the merry songster of the woods. It hardly appears credible, and yet is true, that through the vast extent of China proper, save a few aquatic plants, not one herb is found indigenous to the country, unless cultivated by man. Such is the result of a few thousand years of continuous tillage of the soil. Presently call into operation one of those great political revolutions which sweep an industrious nation from the surface of the earth, or replace it by a barbarous one, the soil will cease to yield its harvests of corn, the rice-fields will dry, not to be replaced by the ancient forest, but to make room for the steppe, the desert. Let us follow up this reflection more in detail.

Setting aside the vexed question of the cradle of mankind, leaving it unsettled whether a paradise was on the table-land of Armenia, in the lovely vale of Kashmere, or near the terminus of the two mighty rivers of Central Asia, there can be no question that the first migrations of men took place towards the bottom land, between and around the Euphrates and Tigris, and along the shores of the Caspian Sea. There we see, at the earliest dawn of history, mighty empires flourish—not blooming into existence, but having already passed over that

maturity of national development, where the rough virtues of the founders are softened into the refined enjoyment of life, under whose stimulus arts and sciences spring into existence. We actually find them in the last stage of degeneracy, where refinement dissolves itself into voluptuousness, and the effeminacy of manners indicate the impending dissolution of the body politic. A succession of four great empires, one taking the place of the other, passes before our astonished eyes before even authenticated history begins; and yet the wondrous monuments, extracted by modern searchers from the bosom of the earth, lift from them the veil of myth, and divest doubt of its support. To this centre points the tradition of the Vedas, the Holy Writ of the Jews, and all historical evidence of the Caucasian tribes, as their origin. From there the man of Ur came with his flocks to settle, by the Lord's command, in Canaan; from there emerged the Pelasgi and Hellenes, destined to shed a never dying lustre over the land of their choice; and later the Goths, Huns, Mongols; and last, the Turks, to crush the decaying empires of the west, either to invigorate their dying civilization by a new stock, or to exterminate it. With them traveled their inseparable companions, the cereals, wheat and barley, already known and cultivated in Greece at the time of Homer—rye and oats completing their migrations at a later time. In vain do botanists now search for the original home of those useful plants, disseminated though they are over the whole expanse of the globe, while all historical records trace back their origin to the starting point of man's migration. From where came the grape, which already tempted Noah's weakness; the fig, date and olive, intimately associated with patriarchal life; the peach, apricot and melon? the cherry, which first paraded in Lucullus's triumphal entry in Rome? The lemon, orange, mulberry, and many other of the precious gifts of a bountiful Providence, which delight the senses of mortals? All testimony coincides that these countries were amongst the most favored of Nature's creation, swelling under exuberant prolificness. From the remotest times of antiquity man felt attracted towards these regions, and generation followed upon generation, populous cities were destroyed, to be superseded by others more splendid. As late as the time of Alexander, the great conqueror's historian tells us of

the country between the Tigris and Euphrates, that "its soil is so rich and fecund, that they say the cattle must be driven off from time to time, lest they perish from surfeit." Compare with this the reports of recent travelers, who in these very regions have to wend their toilsome way over dreary deserts for weeks together, and in what few spots they find the country looking green and blooming on both sides of the river, have to limit it by the addition, that the fertility extends only a few miles inland, but beyond all is a sandy desert. "Most striking in this part of Mesopotamia," says Ida Pfeiffer, "is the entire want of trees; for the last five days I have not seen one, and I believe there must be many people who have never seen any in their lives. There were tracts of twenty or thirty miles where there was not so much as a shrub, though there is no want of (running) water, for no day passed in which we did not cross one or two rivers, large or small." These remarks refer to the cities of the old Assyrian and Babylonian empires. A few degrees farther east the forty marble columns, time out-lasting monuments of the royal city of Persepolis, loom as melancholy land-marks, at the foot of bleak hills, out of a dreary desert. Not more than one-tenth of the whole area of Persia is at present available for cultivation; the rest consists of sand and bare rocks. Turn your eyes to the west—Palestine is no more the land of Canaan, which flowed with milk and honey; the physiognomy of neighboring Arabia seems to have extended over its eastern half. The waters of Merom make room for rice-fields during three-fourths of the year; and the Jordan, the only river of Palestine whose waters flow during the whole year, leaves a dry bed in summer between Merom and Chinnereth, and near the Dead Sea, at the terminus of its course, its depth sinks to three feet. The cedars of Lebanon are thinned; the site of Jericho, the City of Palms, is now occupied by the moveable tent of the wandering Bedouin; palms and ruins are missing. Mount Carmel alone, with its thickly wooded slopes and densely covered valleys, in which myriads of limpid brooks rill through a luxuriant verdure, seems to redeem the old renown of the Promised Land; while the plain of Sharon and the hilly country of Samaria only clothe themselves during the few rainy months in their former splendor. It is not Moslem indolence alone that has to account for

these changes. To finish the picture with the poetical words of the illustrious Schleiden: "No Pythagoras in Egypt need now forbid his disciples the use of the lotus bean; for the soil has lost the power of producing it. The wine of Mendes and Mareotis, which cheered the guests of Cleopatra, and was found worthy the praise of Horace—it has ceased to grow. The assassin will no longer find concealment in the sacred pine forest of Poseidon, to lay in wait for the bard that hurries to the Olympian games, for the pinia has long ago fled from the approaching climate of the desert to the heights of the Arcadian peaks. Where are now the pastures, where the fields around the sacred mansion of Dardanus, which, along the foot of moisture-dripping Mount Ida, fed three thousand mares? Who would now speak of a Xanthus impelling its waves? Who would realize a horse-feeding Argos?"

One simple observation is significant. The clover, which requires a moist climate for its cultivation, has gradually receded from Greece to Italy, and from there to Southern Germany, where already now it begins to be sensibly affected by the increasing drought of summer. Perhaps another singular fact may find its explanation here: Asia, the greatest continent, has a lesser number of indigenous species of plants than Europe.

Let us look at the other side of the picture. Eighteen hundred years ago my goodly fatherland, Germany, received hard names from Tacitus: *Terra in universum aut silvis horrida, aut paludibus jæda, frugiferarum arborum impatiens*: a country either bristling with dark forests or infected by ugly morasses; swampy on one end and stormy on the other. No fruit trees, he tells us, could grow there. The great rivers Rhine and Danube were every winter covered with so solid a crust of ice, that the barbarians would make their predatory inroads in neighboring districts by passing over them with their cavalry, wagons and material. The elk and reindeer, now confined to the Polar regions, as we learn by Cæsar, swarmed over the vast extent of the Hercynian forest. All descriptions of those times would convey the impression, as if it had been a country fit to be inhabited only by brutes and savages, who lived on acorns and would get drunk on barley mead. The parts of Germany with which the Romans at

that time had become best acquainted, were the regions along the borders of the Rhine and Danube.

Now place yourself in imagination, on a sunny May day, upon the hill of Schloss Johannisberg, and let your eyes pass slowly in a circle around you. Is that the same country described by the Roman? Is this the sun that shone on his nation's legions? A checkered cloth of vineyard, corn-field and orchard seems to be spread over the undulating plain; only to be interrupted by handsome villages, flourishing cities, and the parks of the wealthy filled with exotic plants. Take a jaunt over the Bergstrasse, along the foot of the Odenwald; for some sixty English miles you walk through a forest—not of sombre oak and pine, but of fruit trees of every description, the scent of whose blossoms pervades the air with fragrance and fills the heart with delight. In summer ship loads of cherries float down the river; and during the vintage, in the fall of the year, the whole population abandons its habitual occupation to cull grapes and press them in vats, amidst a never ending frenzy of mirth and gaiety. This is the country where neither cherry nor grape would ripen in Tacitus's time. Good wine is now made in Germany as far north as fifty-one degrees. As late as the time of Strabo it was thought that the grape would not ripen north of the Cevennes. At the present day the finest peaches are raised at Montreuil, near Paris, and France is considered the greatest wine producing country of the world.

I have tried to delineate in a few general sketches the two phases of the revolution which civilization—for this I take to be equivalent with agriculture—produces on the surface of the globe. In the first an almost uninhabitable country, the perennial mists of which hardly allowed the sun's rays to touch the ground, has been converted into a lovely garden; in the second, the happiest regions of the earth have been transformed into sunburnt deserts. If we ask for the immediate cause of these changes, we are, besides a few accessory agencies, led to the disappearance of the original perennial vegetation, and more especially the trees. Wherever the hardy pioneer fixes his fireplace, his first work is to lay the ax on the noble king of the forest. He chooses woodland in preference, unless rich alluvial bottom land be at hand, because the organic decay which has gone on for centuries

under its shadowy roof, has enriched the soil with humus, has mellowed the stiff clay, or rendered more compact the light sand. What then is the effect of forests upon soil, upon climate and vegetation?

As long ago as 1804, Alex. Von Humboldt in his "Voyage aux Regions Equinoctiaux," warned that the waste of forests entailed two evils on the following generation: a want of fuel, and a deficiency of water. The reality of the first is self-evident; the second, although perhaps vaguely felt by any general observer of Nature, was first by him enunciated dogmatically. Of course a statement which, if substantiated, entailed such important consequences, was well worthy to arouse a general attention; and since it was first promulgated up to this time, such a mass of evidence has been accumulated that the theory may well be said to have become converted into a doctrine.

The necessary supply of water to a country is furnished by rivers and rain; or more generally speaking, by atmospheric deposit. A falling off in the supply by the former source can take place without a corresponding diminution of the latter, although a decrease of rain will always be followed by a scarcity of running water. Springs and sources originate on the same principal upon which artesian wells are constructed. The water, precipitated from the atmosphere as rain, dew, etc., is taken up by the upper permeable layers of the soil, filters through them, follows rents or fissures in the rocks until a solid rock or stiff layer of loam oppose its further progress, and oblige it to follow the declivities of the same; passing by lateral fissures, or heaved up by the pressure of the following waters, it reaches the surface as spring or source. Supposing a sufficient quantity of rain to fall, the amount of running water may still be affected by two causes: a quick evaporation on the surface, or undue hardness and resistance of the soil. How from a surface exposed openly to the unmitigated rays of the sun, a great waste of deposited moisture should take place by evaporation, needs no further commentary; nor will any one who takes a look at the bleak slopes of the steep basaltic hills back of our village, find difficulty to conceive how a heavy dashing rain will wash away the minutest particle of soil, as soon as it forms from the disintegration of the rock. In the same manner the light, moveable humus soil, left after the clearing of a forest will,

when situated on a declivity, be swept away as soon as the firm interlacing net-work of roots and rootlets has lost its vitality, and no leafy roof moderates the force of the dashing torrent. In both instances an impermeable stratum remains on or near the surface, and the watery deposit, when small, will return to the atmosphere by evaporation; or when large, sweep down in torrents, overflow the beds of rivers, and pervert, by sudden inundations, into a curse what ought to be a blessing to man. A forest will not only, by its cool shade, lessen greatly the evaporation and retain what evaporates under its vault, but its canopy will also moderate the impetus of the falling drops and distribute its descent over a longer space of time. Besides, the humus layer forming its floor, by virtue of its great hygroscopic capacity, retains for a long time the imbibed liquid, and thereby regulates the flow of the rivers, preventing their sudden overflowing and yielding them food long after the rain has ceased. The inundations, of late so frequent, of the river Oder, in its lower course, are attributed by experts to the waste of forests in the mining districts of Upper Silisia, while it is stated that the planting with trees of the formerly naked slopes of the French Alps has done away with the torrential floods which formerly devastated the lower valleys. With regard to the obstacles offered by a thick forest to evaporation, a traveler in South America says: "In the forests the humidity is constant; it exists long after the rainy season has passed; and the roads that are opened through them remain through the whole year deeply covered with mire. The only means known of keeping the forest ways dry, is to give them a width of from 260 to 330 feet, that is to say, to clear the country in their course." A remarkable instance of how running water diminishes by mere evaporation, without falling off, even with the increase of the yearly quantity of rain, is related to us by Bous-singault. The metalliferous mountain of Marmato is situated in the province Papayan, in the midst of immense forests. The stream along which the mining works are established is formed by the junction of several small rivulets, taking their rise in the table land of San Jorge, which overlooks the establishment, and is thickly wooded. When Bous-singault visited the place in 1826, he found only a few miserable cabins inhabited by negroes, but on his return in 1830 the

country had the most flourishing appearance. It was covered with workshops, had a foundry for gold, machinery for grinding and amalgamating the ores, and a population of nearly 3,000 inhabitants. It may be imagined that during these four years an immense quantity of timber had been cut down, not only for the construction of machinery and houses, but as fuel and for manufacturing of charcoal. The felling had principally gone on on the table land of San Jorge. But scarcely had two years elapsed before a notable diminution of the water in the stream was noticed. The volume of the water had been measured by the work done by the machinery, and actual gauging at different times showed the progressive diminution of the water. The question assumed a serious aspect, because at Marmato any diminution in the quantity of water, which is the moving power, would of course be attended with a proportionate diminution in the quantity of gold produced. As soon as the diminution of the stream was ascertained, a rain gauge was set up, and in the course of the second year of observation a larger quantity of rain was gauged than in the first year, although the clearing had gone on, still there was no appreciable increase in the size of the running stream. A very similar observation has been made on the Island of Ascension, where an excellent spring at the foot of a mountain, originally covered with wood, dried up when this was cut down, but reappeared in former abundance when the mountain was planted again. Such remarkable effects, arising from the operation of causes limited to narrow localities, cannot be attributed to a diminution of rain. In the first cited instance there was even in one year an uncommonly large fall of rain—undoubtedly accidental. Undue evaporation only can be assumed as the sufficient cause.

Let us now see how forests may effect the absolute quantity of rain, or precipitate of atmospheric moisture. From the surface of the water and the exhalation of plants and animals a constant evaporation of watery vapor is carried on. The vapor, consisting of an aggregation of small vesicles, according to its lesser specific gravity, rises steadily from the lower and warmer to the upper and colder strata of the atmosphere. Every gas, under a given temperature, can only take up a certain maximum of moisture; when it has reached that,

we call it saturated. When it is saturated, any addition of vapor will be condensed again to water. The lower strata of the atmosphere being warmer than the upper ones, take up a larger quantity than the latter; consequently these will be saturated, while the former still retain capacity to take up more. As soon as this point is reached, all surplus in the upper regions will have the effect to coalesce those countless invisible vesicles in a lesser number of larger ones, whereby they become visible to the eye as clouds. The more this condensation proceeds, the heavier the vesicles will become, until their specific gravity exceeds that of the atmospheric air, when they fall down. In their downward course they steadily grow by appropriating to themselves the surplus of the lower strata, which, by their contact, are suddenly cooled down beyond their saturation point, and reach the earth as rain. Not unfrequently it happens—and we in Honolulu may witness the sight almost daily—that when a rain-cloud has to pass, in descending through a drier stratum of atmosphere, whose temperature is considerably higher than its own, it dissolves again by evaporation and disappears. The same effect of course is produced by dry and warm winds. But any strong wind may, for a limited locality, become a cause of disturbance, inasmuch as its impetus will overcome the specific gravity of a cloud. From these preliminary considerations it seems to be a lawful deduction, that any causes which increase the moisture of the atmosphere in general, and lessen the temperature and dryness of the lower strata, will augment the fall of rain. Have forests a tendency in either of these ways?

The great source of atmospheric moisture is the vast expanse of flowing and standing water; for an insular climate it is the paramount one, against which all other sources sink into insignificance. But different is it with vast tracts of wooded land in the interior of a continent, particularly where a high wall of mountains forms a barrier to the sea wind. There the amount of moisture exhaled in the vegetating process will play an important part; and indeed Humboldt considers it as the great factor by which forests increase rain.

Far different however is it with regard to the second question: Do forests contribute to cool the lower atmosphere? A child knows that a shade affords coolness by intercepting the rays of the sun, and any

one superficially acquainted with the laws of natural philosophy can tell you that a dark colored surface, as the saggreen of leaves, imbibes the rays of caloric, while a light one, like sand or limestone, reflects them, and thereby heats the ambient gaseous medium. The imbibed heat again is spent in hastening the evaporation of the water contained in the leaves. But in evaporation of liquid a considerable amount of caloric is bound as latent heat, which is abstracted from the ambient medium. Pour a drop of ether on your hand and you will soon perceive the cooling effect of its transition to gas. Similarly the exhalation of plants. Thus the forests may operate in a variety of ways towards reducing the temperature of the lower strata of atmosphere, and therewith their point of saturation.

But these are not the only, perhaps not even the principal, ways in which forests contribute to fix the atmospheric moisture. Let us consider how dew originates. A general property of all bodies is that of radiation of heat. A body will constantly emit heat to the surrounding mediums, and only keep up a steady temperature, when it receives as much as it gives off. Different bodies possess this quality in a different degree: gases and atmospheric air have least of it, most of all organic substances, particularly such as combine greatest surface with least bulk, as cotton, wool, feathers. During a clear and calm night, when the great generator of caloric, the sun, has sunk below the horizon, and no other source of heat is left but the imperceptible one of the proper heat of the earth, all bodies will steadily lose heat by radiation towards the upper regions of the atmosphere, for these being greatly cooler than the lower ones will abstract heat without rendering an equivalent. Any fast cooling body will, by lowering the saturation point of the surrounding atmosphere, precipitate the vapory moisture in it; a principle upon whose application Daniel's hygrometer is constructed, and upon which rests the formation of dew. Dew is only observed during calm and serene nights, whatever obstructs the free communication of the lower and upper regions of the atmosphere, as clouds or smoke, prevents the formation of dew, because it lessens the radiation towards the upper atmosphere. A wind likewise will interfere with the formation, as it brings warmer air in contact with the radiating body. You all will

be aware that you enjoy the most refreshing sleep during a calm night with an open starlit sky, while the air becomes sultry and oppressive when the heaven is clouded. Grass and leaves being in themselves strong radiators will cool the more rapidly, as they have only a slender communication with the earth, by which the acquired sun heat of the latter might be conveyed to them. Thus a thermometer laid on the bare ground will stand from ten to fifteen degrees higher than one suspended between the grass. For this reason grass and trees are covered with dew, when rock and stone are not, and are dripping when these are moist. In tropical countries this phenomenon must necessarily appear more striking on account of the greater diffusion of watery vapor at elevated temperatures. "In the bivouac on the edge of the forest of Cauca, between the fourth and fifth of July," says Boussingault, "the night was magnificent; nevertheless, in the forest, which began at the distance of a few yards from our encampment, it rained abundantly; by the light of the unclouded moon we could see the water running from the branches." Those of you who frequently have to repair to our mountain woods know, that if they go before the sun has moved near its meridian they are likely to have wet feet, even though it had not rained during the night, and the open plains appear dry.

What I have said with regard to emanation of heat has only reference to the nightly formation of dew, which, although of less consequence for most countries, plays a most important part in countries where it hardly ever rains, as in the district between Payta and Lima. Let us however carry our considerations a little further. If we apply the law of emanation to a large tree, we find that free radiation can only proceed from the crown of the tree. The lower branches cannot radiate towards the sky, as the upper ones act in the manner of a screen; but in the measure, as the leaves of the crown cool off, the next lower ones will emit heat to them, which these will again send off towards the sky. The same process is thus continued progressively from all the upper to the lower branches, and the amount of caloric withdrawn from a given area grows in progression. Of course the air circulating between the leaves participates in the loss. In this manner Humboldt has calculated that a tree which presents

a horizontal section of not more than one hundred and twenty or one hundred and thirty square feet, actually influences the cooling of the atmosphere by an extent of surface several thousand times more extensive than this section. What a condensing power is thus created in a tropical forest! Aside by this a priori deduction set the fact, that in wooded tropical regions about seventy per cent. of the annual average of rain falls during night, and you will find the connexion between cause and effect immediate. The effect of such an amount of cooling down, it is easily conceived, cannot be limited to the night alone, but must necessarily extend at least over a great part of the day. Thus we may contend with full reason that forests cool down the average temperature of a country, and thereby contribute powerfully to the condensation of atmospheric moisture in the shape of rain or dew.

It was long maintained by many observers that forests could have no influence on increasing the annual quantity of rain, however much they might contribute, by lessening evaporation, to keep up a due amount of running water, or to regulate the fall of rain over the different seasons. The aggregate amount of rain falling on our globe, or even within defined zones, in the course of a year, probably does not vary as long as the sun continues to send us every year the same amount of heat. But certain localities may be enabled to appropriate to themselves an uncommonly large proportion; and perhaps there prevails even in the grand chain of cause and effect in the universe, the law of commerce, that the consumption regulates the production. The quicker the atmosphere is debarrassed of its load, the sooner it will charge again. Be this as it may, experience seems to have decided the fact, that for given localities forests increase the mean annual quantity of rain. In St. Helena, where extensive plantations have been carried on for a number of years, careful observations show that the yearly average of rain has almost doubled since the time that Napoleon was a prisoner in Longwood, and the torrential floods, formerly so common, have not occurred for the last nine years. The most remarkable instance in point is probably the lake Aragua in Venezuela. This large inland lake, bounded on all sides by high ranges of mountains, which pour in their waters, and at the same

time debar its outlet, was seen and accurately described towards the end of the sixteenth century by Oviedo, who says that the town of Valencia was founded 1555, at the distance of half a league, or one and a quarter English miles, from the shore. When Humboldt visited the valley in 1800, he found the town three and a quarter miles removed from its banks. What formerly had been described as isles or shoals, were now main land or peninsula, and new isles had arisen from under the surface of the water. Rich bottom lands had been gained by the retrocession of the water, which were covered with flourishing plantations of cotton, sugar, and cacao. The whole valley bore the loveliest aspect, covered as it was with the work of industry and labor. Even the slopes of the hills had been stripped of their trees and transformed into corn-fields. The retrogression of the lake had been noticed by the inhabitants with astonishment, and was generally ascribed to a subterranean outlet. Humboldt's genius divined the true cause, and from it threw out the warning with which I introduced the present investigation. Some time after his leave the war of liberation broke out, slavery was abolished, hands and capital were drawn off for many years, and the flourishing plantations went to ruin. The maize and corn-fields on the slopes gave way again to brushwood and forest, which sprang up quickly, with that exuberance proper to the rich gem of the tropics. Twenty-five years after Humboldt, Boussingault visited the place, and now found that the water of the lake, instead of continuing to recede, had risen perceptibly, submerging the isles of new formation and swamping the cotton fields on the rich bottom lands.

Lakes without exit which receive the waters of hill-bound basins of considerable extent, are certainly the best test gauges to apply to the present question. Observations in regard to them are manifold in all continents. So Boussingault infers from numerous data, that the two lakes of Ubaté and Zimiyaca in New Grenada, two centuries ago, only formed one sheet of water. The country round them has since been cleared of woods for the supply of fuel for two neighboring salt springs. And as a contrast, he remarks the lake of Quilatoa, not far from the former, which was exactly measured by Condamine in 1738, was found by him in the same limits in 1831. This lake is situated

at an elevation of 13,000 feet, uninfluenced by the effects of agriculture and vegetation. Similar are the conclusions Saussure arrived at from a careful study of the lakes of Neufchatel and Brienne, and Morat, and those of Humboldt with regard to those of Southern Siberia. Hindostan also offers some direct instances to the point. On the high table land of the Dekan the annual rain fall averages from 60 to 200 inches; but in some of its districts, which have been extensively robbed of forests, precise observations show only a fall of 10 to 25 inches. The reckless destruction of the spice trees on some of the Banda Islands, prompted by Dutch avarice, has converted these gems of the sea into as many bare rocks. From the Cape de Verd Islands sounds this moment a cry of distress. The usual drought which since the destruction of the woods befall these now to rock and sand reduced islands, (for three successive years they have had no rain,) have again produced one of their regular effects. Famine and disease had slaughtered already six thousand of their wretched inhabitants before the beginning of April, and two thousand more, so says the proclamation of the Portuguese Governor, would fall by the scourge before the end of summer unless charity from abroad sent relief. I could multiply my illustrations, but shall conclude with calling attention to the state of climate on the Pacific coast of South America, from the Gulf of Darien down the coast of New Grenada and Ecuador, in contrast to the immediately following coast of Peru. Both are, so far as mean annual temperature, proximity to the sea and high mountains, prevailing winds, etc., are concerned, similarly situated; but the former is densely covered with forests, while the latter is remarkable for its total absence of the same. Now what is the result? The former is supplied abundantly with rain; in the province of Chocos it rains almost incessantly, while in Payta it has not rained once in seventeen years. One tract of the Peruvian coast, "Sechura," derives its name from this circumstance. It is well known that the inhabitants of Lima consider roofs a superfluous incumbrance to their houses.

I might still enlarge upon the fertilizing agency of forests in fixing the carbon of the atmosphere, thereby supplying the soil with humus, or the great superiority of rain over running water, inasmuch as the

former precipitates, in the shape of carbonate of ammonia, the nitrogen so indispensable to the most nutritious parts of a plant. I could demonstrate to you that the mud which now threatens to fill your harbor, and exposes you to the heavy expense of dredging it, would for the greatest part have been retained on the inclined planes of your valleys, to become as useful as it is now annoying, by the presence of trees, if I did not fear to draw out to undue length my present discourse.

Thus the testimony in support of our main question has accumulated so as to raise it beyond all controversy. Extensive forests will render the climate cool and wet, while absence of them imparts to it dryness and warmth. The former engender a multitude of brooks and rivers, swamps and lakes, and envelope the surface in mists and fog; the rains are equally distributed over the seasons; the difference between the mean temperature of summer and winter is small; agriculture will only prosper where the aggregate amount of summer heat is large enough to mature its products—that is, in lower latitudes. The latter condition gives to the country a clear unclouded sky; the difference between summer and winter temperature becomes excessive, the winters are colder, the summers warmer; the rains either disappear or are limited to one short season, in which they fall with extraordinary violence and overflow the generally dry beds of the streams; vegetation is suspended during a greater part of the warm season. Neither of these conditions of climate is particularly favorable to agriculture. Here, as everywhere, the golden middle road is the best. Clear enough ground to allow the sun to exercise an impression sufficient to accumulate during the vegetating season heat enough to mature the seed and fruit, but retain trees in sufficient number to attract and economise the necessary supply of moisture, indispensable to all organic beings. Now it will be clear how in one place agriculture will appear to have changed a wilderness into a lovely garden, swelling with the richest offerings of Nature's choicest gifts; while in another the arid sand of the desert settles down where reckless selfishness of man, in its steady combat with Nature, succeeded in routing the latter. There we see the first stage, here the second of the grand revolution. What a terrible warning! What an amount of wholesome instruction is contained in this reflection!

No one has more forcibly expressed these sentiments than the venerable veteran amongst the eminent naturalists of our age, Elias Fries, of Lund, in Sweden: "A broad border of devastated land follows progressively the steps of cultivation. With its extension its center and cradle dies, and only in the circumference are found its green branches. But it is not impossible—difficult only for man—to repair the damage he has inflicted without renouncing the blessings of cultivation itself. He is destined to be the Lord of creation. It is true thistles and thorns, ugly and venomous plants, poignantly called dunghill plants by botanists, trace the path which man has traveled hitherto over the earth. Before him lays primitive nature in her wild but sublime beauty; behind him he leaves the desert, an unseemly, exhausted land. For childish love of destruction, or improvident waste of the vegetable treasures, have annihilated the character of nature, and, frightened, man himself flees from the scene of his misdeeds, leaving to savage tribes or the wild beast the degraded earth, as long as another spot allures him in virgin beauty. Here also, seeking selfishly his own gain, and following aware or unaware the most abominable principle, the most execrable immorality ever enunciated, "*apris moi le deluge*," he begins anew his work of destruction. Thus the moving cultivation left the East, and earlier perhaps the desert; spoiled of its vestments, thus it abandoned the whilom beautiful Greece to savage hordes. Thus this conquest rolls with stupendous celerity from east to west, through America; and there now already the planter leaves the exhausted soil of the eastern shores, the climate rendered unproductive by the annihilation of the forests, to imitate in the far west a similar revolution. But we see also that noble men, of truly cultivated minds, commence to raise their warning voice to begin on a small scale the second more laborious task, to restore Nature to her strength and vigor. Truly, this undertaking is at present feeble, and disappears in view of the great object to be attained, but it preserves the faith in the destiny of man and in his power to fulfil it. In future man will and must succeed to free Nature, while controlling, guiding and protecting her, from the tyrannical slavery to which now he debases her, and in which he can only maintain her by a never-ending struggle against the eternally rebel-

lions. In the dim distance of the future we see a reign of peace and beauty on earth and in nature, but before man reaches it he will have to take many lessons from nature, and before all, emancipate himself from the chains of egotism."

Indeed, the attention of scientific men and governments has been seriously aroused to the importance of the subject. More than forty years the maintenance of existing and nursery of new forests has been a prominent care of the German states; not so much at first from a proper understanding of the enunciated principles as from the necessity to keep up a due supply of fuel and timber. At present however these principles are fully appreciated, and the extensive plantations on naked hill ranges or unproductive plains give ample evidence of it. A special branch of officers is appointed by governments, municipalities, and large land owners, to watch over the interests of the forest; and special schools, distinct from those for agriculture, are established and liberally endowed for instruction of pupils who devote themselves to this particular study. In Germany the schools of Tharand and Hohenheim, in connection with the name of a Cotta and Hartung, have signalised themselves. At a meeting of the British Association at Ipswich, in 1852, the subject was profoundly discussed and its importance seriously pressed on the attention of the English public. In Hindostan the East India Company has taken vigorous steps to inhibit the destruction carried on formerly, and to fill up by plantations on a large scale the void produced by them.

So far, Gentlemen, I have entertained you at great length of time with the disastrous influence of civilization upon climate and nature at large. But where, will you ask, is the application to our young country, where civilization only dates since yesterday; where agriculture is just beginning to impress upon it the stamp of refinement and embellishment, which you before described as its first stage? I will admit for a moment the validity of your objection. In that case my answer is this: if there are no faults and wrong doings of men that need correcting, it is the short-comings of nature which I should wish to see assisted and hurried on. To speak more plainly, the gist of my foregoing remarks is, that a certain amount of perennial, high and dense vegetation is necessary to secure the interests of ag-

riculture on a permanent basis; that in other countries this condition existed but has been destroyed by man, but that our country has not reached a sufficiently advanced age, wherein nature might have accomplished its great end of covering the earth with vitalized beings, which are necessary to complete the great cycle of action and reaction on each other of earth and atmosphere.

It may safely be presumed that when the mighty fiat first sounded over the great expanse of land and water, the ocean quietly rolled its billows over the spot where now our archipelago has risen. When those immense forests of Calamites, Sigillarias and Lepidodendrons accumulated in the bottom lands of receding waters, to be submerged by the irrient flood; which again receding, left their debris covered with a deposit, thus again forming the ground-floor for a new vegetation, only to be buried and to resurge by the same process—that epoch is probably far anterior to the birth of our islands, which, besides the immediate compounds of Vulcan's subterranean fires, do not present to the geologist but formations of the latest epoch. There are even reasons to suppose that organic life began here a long time after the last configuration of the earth-crust, after it had made considerable advance in other parts of the globe. Yet our islands have a creation of their own, even peculiarly their own, from which starting nature began in her slow progress to cover every spot, as it became inhabitable for organized beings. Soon the waves scudded along from distant regions a stray cocoanut, a hard shelled bean or pandanus seed; the winds carried over the almost microscopical spores of cryptogamous plants and seeds endowed with wings or parachutes, (although the small number of plants with this kind of seed in common with neighboring countries might make us infer, *a priori*, our great remoteness from them,) birds dropped a small amylaceous or grass seed, entangled in their feathers elsewhere; and last of all came man, bringing with him the means of his sustenance—probably the banana and breadfruit. But man, after having been deposited here, was cut off from his anterior home, and therefore with, or soon after his arrival, his agency ceased. Only with the appearance of the white man another era dawned; he at once bound this isolated group to the five continents; and established a high way on which

what lived or breathed in distant regions might wend its way hither. What to accomplish, nature alone in her slow but steady way would have required hundreds of years, the intellectual, analysing, and combining power of man, penetrating and imitating her own laws, may do in as many decenniums, not indeed on such a gigantic scale as nature is wont to do it, for with all his application and energy his works will ever remain dwarfish when compared with her immense powers; but on a small scene of action, when his works are favored by the forces of nature, he can make a great impression on the physiognomy of a country.

Wherever the white man goes he carries with him his accustomed means of sustenance; the cereals follow him like his shadow. With the cereals he spreads involuntarily the seeds of weeds whose favored habitat is with them. Culinary vegetables, fruit trees, ornamental plants follow next, a great many of which soon acclimate and become naturalised. Many wild plants stick to his steps, as it were, as an indispensable accessory, although neither utilitarian reasons, nor particular aptitude for transmissibility in the seed, account for it. Thus the plantain, *plantago major*, invariably sprung up where the settler in North America raised his cottage. The Indians still call it the white man's footstep. It has followed him here. Another plant growing around you, the thorn apple, St. James's weed, *Datura Stramon*, originally an East Indian plant, spread from there with the migration of the Gypsies over Asia and Europe; from Europe the white man carried it to America, Africa, and Australia. During the great war movements of 1814 and '15 it was observed that a *Siberian Corispermum* sprung up wherever the Cossacks had pitched their tents in Germany. From America the *Erigeron canadens* spread over Europe; from there it went with the colonist to other continents. These vegetable migrations following, as it were, spontaneously in the wake of man, are as many agencies in increasing the vegetable stock of a new country; but they will fall short of the vast auxiliary which can be offered to youthful nature by the thinking mind of man, when he takes the light of science as a guide to investigate the true wants of the country, and directs her energy in conformity with the organic laws of nature.

This, my friends, let us endeavor to make our great aim on these virgin islands, where we have met together from so many parts of the world to be formed into a homogeneous community. Rare advantages accrue to us from the various combinations of elements of which our rising state recruits itself. The matured experience and knowledge of many nations is centered in your society. You are situated on the central station of important commercial lines, have direct communication with four continents and many island groups. The great variety of your climate permits you to appropriate to yourselves most productions of warm and temperate zones. Insufficiency of perennial vegetation is the only true cause which renders our Islands so far inferior in their resources to the islands of the East and West Indies. Take a survey of the different districts of our group. Those you will find the most productive which are in the neighborhood of, or surrounded by wooded mountains, as Hilo and Kona in Hawaii, and Hanalei in Kauai. Go to work then to fill up the lacunas left yet by nature. Cover the dreary dark of our naked hills with the fresh verdure of shrub and tree. Intermingle the lofty pine and cedar with the graceful acacia, the stately eucalyptus, the broad shaded tamarind and ceiba! Between them rear the towering teak tree of India, and the gigantic sequoia of California, to yield in times to come the solid timber for your nascent shipping. The dark foliage of the orange and citron, serving as foil to their golden fruit, must cluster round the cool moss-inlaid springs, which will soon bubble forth as if struck by Moses' rod, from every nook and corner between rocks, and under the fern tree, to unite in rivulets and streams which, encased in a framework of bamboo cane and lianes, will pour out of every valley, and cover with fertility the now arid and sterile plains. Then these will swell, as if Pandora's horn were emptied over them, with the turgid cane, the fragrant coffee, the speckled cotton and broad leaved cacao, while here and there a copse of wood and shrubbery will offer shelter and food to those lovely songsters whom you are so anxious to admit into your society, but who certainly will shun it, unless you build them convenient houses, and plant them food of their liking. Thus your islands, looming over the distant horizon, encircled with a columnar row of massive cocoas, graceful arecas

and stately coryphænas, will indeed appear to the approaching stranger, like a cluster of gems in the wide ocean, bidding fair to realise the fanciful dreams of his youth.

But before all, let us not neglect the vegetable treasures already accumulated by Nature's own unaided efforts. But here we are suddenly arrested in our fanciful excursion by a sad reflection. Have we really only the grateful task to assist nature, to rear into vigorous manhood the tender child intrusted to our care? Alas, our civilization only dates of yesterday, and already nature bleeds from many wounds inflicted by the cupidity and reckless selfishness of man. Where are the forests of sandal trees, which used to shed a halo of fragrance around the mere name of the Hawaiian Islands? A vast source of wealth has been dried up, a rich mine of gold—whose yield ought to have increased from year to year—has been squandered away, perhaps never to be worked again; for what little there is left of it, mostly crippled shoots of old trunks, bids fair with its slow growth to be stifled and crowded out by meaner, more precocious neighbors. Another source of wealth, whose importance will only be appreciated when our neighbors of California and Oregon have made sufficient progress in industry to be able to dispense with imported furniture, exists in the koa tree, *Acac. heterophylla*. Its many fine qualities for cabinet work make it equal to mahogany; in durability of color it excels the same. If we go on to fell these trees without proportioning the increase to the consumption, this source of wealth is likewise doomed to extinction,—a fate which has already befallen the splendid tamani, *Calophyllum inophyllum*, of which only a few relics exist on Molokai. Has any one of you met with a fresh plantation of cocoa palms? How is it that, for instance, here on Oahu the magnificent and productive bread-fruit tree is so little cultivated? Is there a tree more picturesque to the eye, offering at the same time a liberal shade and a most nutritious, pleasant fruit? In the valley of Hanalei grows a tree, (of the genus *Xanthoxylum*) called by the natives makehana, whose seeds, *seed-capsules*, and leaves are impregnated with a spicy aroma similar to cardamon, but sharper to the taste. It is, to my knowledge, not found in any other locality, and to all appearance is indigenous. Unless taken care of, it may be

lost, sooner or later, whereas, if propagated and protected, it is likely to become an important addition to the number of known spices, and a valuable article of export.

It cannot be denied, that in many places the domain of forest has been seriously encroached upon by man, and more by cattle. In the February number of the Sandwich Islands Magazine, an intelligent observer calls our attention to the startling fact, that the whole plateau of Waimea, in Hawaii, over twenty miles in length and five in breadth, has been spoliated entirely of its original forest, which only twenty-five years ago formed an impenetrable thicket, by the agency of wild cattle; not a tree or shrub is to be seen now from Kawaihae to the opposite sea-shore. Mark the effect: for the last nine months, as I am informed, they have not had a rain shower. The extended plain, which, after having been divested of its trees, probably was supposed to yield abundance of pasture to flocks and herds, is parched and cracked; not a blade of fresh grass is to be seen; clouds of dust have taken the place of rain-clouds, and the cattle to escape starving, have to repair to the side valleys of the Kohala range and Mauna Kea. Do not object to me, that we have had an unusually dry year over the whole group, for I have yet to learn that any other region as elevated as Waimea, 4000 feet above the level of the sea, which has retained its native foliage, has been visited by a similar drought. It is alleged that the climate has improved since this process of destruction was carried on. It is true, raw mists and chilly winds are not so frequent there now, and the squally *mumuku* has ceased to blow, but perhaps the latter might have been averted, not by killing the vegetation on the high plains of Waimea, but by starting a new one on the slope of Kawaihae, which would have reduced the excess of heat peculiar to that desolate lava region. Besides, it may be necessary to remark here, that salubrity and productiveness of a country do seldom go hand in hand. For, taking as a measure for general salubrity, the average per centage of deaths by consumption, we find that the healthiest spots until now ascertained are neither Rome, nor Madeira, nor the Provence, but the rainless coast of Malaga in Spain, those parts of Egypt above the Delta, nearest the desert, and, before all, Algiers, where, according to Drs.

Haspel and Jourdain, only one death in seventy-five is due to consumption, while in Paris and London the proportion stands one to five.

During my short stay in Australia, I had ample opportunity to notice the disastrous effects of cattle and sheep on vegetation. In South Australia, for instance, the original flora has almost disappeared on the rich plain between the sea and coast range. Even the formerly impenetrable thicket of the scrub along the river Murray, begins to feel its effect. Perhaps that country, which, almost shadeless on account of the perpendicular inclination of the plane of its foliage, whose tough, leathery qualities, almost unfit it for a copious perspiration, lacks of rain for eight months in succession, will in distant future have to regret that its early colonists began their work of civilization with flocks and herds. Of all the destroying influences man brings to bear on nature, cattle is the worst. In what are now the Kirgisian steppes, between the Altai and Ural mountains, Humboldt found a remarkable succession of lakes, from whose relative positions to each other, in combination with the geographical formation of the country, he concluded that they formerly had been united in one sheet of water, which covered the vast plain. The great traveler does not refer to great physical revolutions which might have opened an outlet to these accumulated waters, but from more direct observation made in the neighboring steppe of Bareaba, he is led to believe that the presence of man has to account for it. A retrospect in history however shows us, that this is part of the very country where lived the Scythians, from where issued the Huns, Mongols and Turks, all nomadizing tribes, which to our knowledge had only a faint acquaintance with agriculture. Herds of cattle and horses were their sustenance, formed their wealth. Is it not legitimate, therefore, to ascribe to them this great change in the physical physiognomy of this country?

Let us take a warning from such ominous examples. The small area of our islands is too valuable to be devoted to cattle rearing. Allow them to multiply for all the legitimate purposes of the dairy, home consumption and supply to the shipping. But what goes beyond is of evil. If we rear them for the sake of their hides and tallow, I imagine the expense of producing these is too great. We forfeit by

it the vital sources of our soil. It is even questionable, if by fostering an export of cured or dried meat, we promote our true interests. The multiplication not only, but the existence of wild cattle and goats ought to be set a stop to. Where the interests of agriculture and cattle rearing conflict, the former should be protected in preference.

I have not touched yet upon the other evil, arising from the destruction of forests—scarcity of fuel. A few remarks will suffice. In our community this evil is already felt severely at the present time; the high price of fuel attests it. What we consume in Honolulu, has for the greatest part to be brought from other islands. And yet we can never flatter ourselves with the hope to find relief in that great resource which unexpectedly came to help other countries over their impending difficulty—fossil coal. For, adopt either of the two propounded theories about the geological history of our islands, you will arrive at the same result. If you adhere to the hypothesis of a late rising above the surface of the sea, this must have taken place in the latest epoch of the consolidation of our earth's crust; for only coral limestone, with detritus and conglomerations of the basaltic rock cover the lower surface of our basaltic hills; no rocks of the transition or secondary groups which furnish the beds for fossil coal are seen anywhere. Do you attribute an older age to a Hawaiian, or if you will stretch your imagination a little farther, a Pacific Continent, which by gradual subsidence has left the peaks of its highest ranges as our present archipelago, then those plains and estuaries, where ancient vegetation either grew or became accumulated by the rush of waters, must lay now submerged deep beneath the rolling swell of the ocean. Thus our only resource will have to be found in our forests. A little further reflection on our part must still more forcibly impress us with the importance of the subject. The number of species of trees as are well adapted to produce heat for economical purposes, is very limited. The prevailing character of our forests is that of bush and shrub; most of the taller trees are of so light a texture as to be unfit for heating. How does it stand with the fuel trees mostly in use? The ohia lehua (*metrosideros polymorpha*) has probably in former times been the most prevailing tree over the group. It is not

now. I have seen only few scattering rudiments of it, where there are unmistakable indications that formerly it covered extensive dimensions of ground. But the demand for fuel must necessarily grow in proportion to the increase of population and the concomitant necessary establishment of workshops and factories. I do not wish to be understood as favoring the introduction of manufactures at large in our fair islands; on the contrary, I most heartily deprecate such an idea; besides, I consider its realization impossible. But there are certain branches of industry a well organized community cannot dispense with. These are either such as enter into the primary necessities of daily life, but cannot on account of undue bulk be shipped without raising the price quite beyond proportion, or such as can be produced with small labor on the spot where the raw material is raised. To confine myself only to one example. We build our houses of the very material least suited to a warm climate, of wood. Not only does it oblige us to live, or rather to swelter, in an atmosphere often heated almost to the temperature of blood, but it exposes our fast filling villages before long to a great and inevitable calamity. Coral rock, the only other material on hand, commands on account of the great labor its cutting requires, such a price as to be only within the reach of very few. Besides, it could only be used to advantage for larger buildings. The only good building material which ought to be general amongst us, and at the reach of every one, is bricks. Transport from the United States raises their price to six or eight times their original value. Good raw material is in abundance amongst us; the alluvium on the banks of the river and the deposit in old taro patches chiefly consists of a very stiff clay, the common product of disintegration of basaltic rocks. On the banks of rivers it may be obtained, almost pure, unmixed. On inquiry why no bricks were made here, I have been told that attempts had been made, but the high price of fuel obliged the undertaker to abandon the enterprise as unprofitable. Part of the preceding remarks will also refer to pottery. With regard to this branch of industry it may be of use to record, that in Teneriffe, in order to obtain the clay of which those valuable porous water jars, *gargolettas*, are made, the natives build retaining walls at the foot of the mountains, to collect the water which deposites this precious detritus of their trachytic rocks.

Before I conclude, I cannot but refer briefly to the shelter well established forests will afford against high wind, by common consent one of the greatest impediments to the successful pursuit of agriculture and horticulture with us. Forests, located with a special regard to the prevailing wind, would be highly beneficial to circumscribed localities. But allow me in this place to advance a hypothesis, according to which, if it should prove correct, the influence of forests in modifying the strength and current of winds, would be of more general application. Honolulu with its environs offers a good example for illustration. The ordinary trades that strike over the plain of Koolaupoko on the windward side, are broken by the abrupt circular range of mountains which include it like an amphitheatre. Their only outlet of this great *cul de sac*, is the deep notch over the Pali of Nuuanu, elevated eight hundred feet above the sea, into which they crowd with concentrated strength. One should suppose that the lower currents, which swept over the plains of Koolau at a less elevation than eight hundred feet, would, in passing the Pali, assume an upward direction, while the upper ones would continue a horizontal course. Such being the case, they ought to pass at least eight hundred feet over our heads, while in reality, as soon as they have traversed the Pali, they take a downward course and sweep over the surface of Nuuanu Valley down on Honolulu. As a general rule our nights and mornings are calm; the trades appear in Honolulu about ten o'clock in the morning, and last to five or six o'clock in the afternoon; that is, just as long as the sun's heat rarifies the atmosphere over the lower part of Nuuanu and the plain. If my recollection serves me right, the wooded part of the valley nearest the Pali is generally calmer than any other part of it; the traveller in approaching the Pali, receives the violent gust of wind quite suddenly when immediately near it. May it not reasonably be supposed, that if we lessen the rarefication of the atmosphere in the lower valley and on the plain, by cooling it down through the presence of trees, we can succeed in giving to the ordinary trades a less downward inclination, to raise it, if not eight hundred feet, at least some fifty or sixty feet over our heads? We should still have breeze enough to make us feel comfortably, but our trees would not shed their fruit, and there would be

a great deal less of rheumatism in our village. Many other parts of the leeward side of our islands are similarly situated to Honolulu.

It remains for me only to make a few remarks on the practicability of a plan of such extent, as the one propounded undoubtedly is. Of course it cannot be accomplished in one year, or a couple of years. In northern latitudes the raising of a new forest, even of fast growing trees, will take from fifteen to thirty years. Here our patience will not have to be put to such a stretch. Where, as I had occasion to observe in my garden, some species of *Acacia* will grow in little more than one year to the height of twenty-four feet, from the seed, *Melias* sixteen feet, and *Casuarinas* ten feet, there it may be admissible to feel somewhat sanguine on the subject. It is my opinion that on the banks of rivers and in low wet places our end may be attained in less than four years. In dry, unsheltered plains, bare hills or elevated districts, it may take longer time. Nowhere, I imagine, we shall have to wait more than six or eight years before some results are obtained. The work cannot be done by a few individuals; the whole nation must lay hand on this great national work. And if it were for no other reason than this, I hail with joy this festival occasion which for the first time has assembled our native friends of the National Hawaiian Agricultural Society with us. The same idea has called their society into life, as ours; the same zeal animates them to realize it, to embellish and enrich the fair land of their inheritance. Let every member of our societies enter an engagement to plant yearly a certain number of trees; let our society import seeds from abroad in quantities for distribution, particularly of such trees as are of some economical use; but let us make an immediate beginning with the vegetable treasures, native or domiciliated on our soil. To prevent failures from error in judgment, Government may designate competent persons whose duty it shall be to select and assign places where a beginning may be made with the best advantage, and appoint wardens for the protection of the young plantations. Indeed, amongst all the monuments a wise and great ruler may erect himself for posterity, which are more beautiful and durable than those that will shed blessing and happiness on his nation's children and grandchildren? Which are greater than those which comprise at once every one of

his subjects and every square foot of his kingdom? Which more admirable than such as founded by an enlightened sagacity, penetrating the hidden future, tend at once to avert unseen calamities and secure unhoped for happiness? Works of this character, not their wars, secure to the name of a Henry IV., Peter and Frederick the Great, a grateful abode on the lips of the humblest peasant of their nations. Thus amongst the claims on posterity's gratitude, the great Akbar founded himself in India, one, not the smallest, consists in his directing "to plant trees of every description on both sides of the canal down to Hissar, both for shade and blossom, so as to make it like the canal under the trees in Paradise, and that the sweet flavor of the rare fruits may reach the mouth of every one, and that from those luxuries a voice might go forth to travelers, calling them to rest in the cities, where their every want will be supplied."

At the conclusion of the above address, a vote of thanks was passed to Dr. Hillebrand, and a copy requested for publication.

A vote of thanks was passed to the Chair, when the Society adjourned till to-morrow to attend the Annual Fair and Exhibition.

WEDNESDAY, July 30, 1856.

The Fair was held this day, at which the Society attended. The following are the Reports of Judges, appointed to examine and award premiums upon articles exhibited :

JUDGES' REPORT ON HORSES.

HONOLULU, July 30, 1856

Mr. President and Gentlemen of the R. H. Agricultural Society:

The undersigned, appointed Judges of Horses exhibited at the Fair held to-day, beg to report, that out of eighteen competitors, they have selected the following as worthy of prizes :

IMPORTED STALLIONS.

- First prize. "Oregon," owned by Capt. J. Meek, a certificate.
 Second do. "Glencoe," do. do.

NATIVE STALLIONS.—*Five entries.*

- First prize. "Democrat," a very fine animal, exhibited by Dr. S. P. Ford.
 Second do. "Young Oregon," by Mr. Gulick.

NATIVE MARES.—*Three entries.*

- First prize. "Scarlet Feather," 3 years old, exhibited by Mr. Thomas Cummins, decidedly the handsomest animal on the ground.
 Second do. "Jilt," bay mare, also owned by Mr. Cummins.

1 YEAR OLD MARES.—*Two entries.*

We award this prize to Capt. Meek's filly "Fanny," but had some hesitation in deciding between her merits and those of a very promising filly, "Laurel," exhibited by Mr. Cummins.

NATIVE GELDINGS.—*Six Entries.*

We award this prize to "Emerald," exhibited by Mr. R. Moffitt, but wish also to mention favorably as worthy of commendation, Capt. Meek's "Frank," Mr. Dowsett's "Robin," and two bay horses exhibited, one by Mr. Andrews, and one by Mr. Sumner.

There was also exhibited a pair of carriage horses in harness, by Mr. Gulick, and though there was no competition, we consider them entitled to a premium. There was no imported mare exhibited, and for the prize for one year old stallions, there was no entry.

M. C. MONSARRAT,
 D. C. WATERMAN,
 R. ARMSTRONG.

JUDGES' REPORT ON CATTLE.

HONOLULU, Wednesday, July 30, 1856.

The undersigned Judges award as follows :

To No. 1, Fat ox, over four years old, (Mr. Armstrong,) bronze medal or \$5.

To No. 41, Imported Bull, (J. Meek,) silver cup or \$15.

To No. 42, Native Bull, (C. G. Hopkins,) silver medal or \$8.

To No. 43, Native Cow, (C. G. Hopkins,) silver medal or \$8.

To No. 44, Best Fat Steer, under 4 years old, (C. G. Hopkins,) bronze medal or \$5.

No. 45, Second Best Bull, (C. G. Hopkins,) bronze medal or \$5.

REMARKS.

The cattle exhibited are of good quality. Only one of a kind were brought on to the ground, which simplified the matter of deciding between the merits of the different animals, and leaves no room for complaint on the part of those who have taken pains to bring their animals to add to the interest of our annual exhibition.

We saw several yoke of oxen, and other cattle on the ground, but were informed that they belong to natives, members of the Native Agricultural Society, who have their own Judges to award premiums.

The want of competition in this department is to be regretted.

Respectfully submitted.

G. P. JUDD,
B. F. HARDER,
F. P. MANINI

JUDGES' REPORT ON BUTTER AND CHEESE.

To the President of the R. H. Agricultural Society:

SIR,—Your Committee of Judges on Butter and Cheese, have great pleasure in reporting that they have examined the various qualities which have been exhibited, and beg to submit the following award of prizes, viz:

To Lot 45, the first prize for the best three kegs of Butter (Sparks).

To Lot 31, the second prize. (H. A. Widemann.)

To Lot 42, the prize on Cheese. (Sparks.)

There were but four exhibitors of Butter, and one only of Cheese. The qualities were all good, and very creditable to the producers.

Respectfully submitted,

B. PITMAN,
SAM. SAVIDGE,
R. MOFFITT.

JUDGES' REPORT ON SUGAR AND SYRUP.

The Committee to whom was allotted the duty of judging the Sugar and Syrup exhibited at the Agricultural Fair, beg leave to report, that after having duly examined the four samples of Sugar exhibited, they award to No. 27 (Dr. Wood) the first prize, and to No. 29 (Lihue Plantation,) the second prize.

There was only one sample of Syrup exhibited, and which was labeled "From the Brewer Plantation," this being of superior quality, to it is awarded the premium. Respectfully,

GEO. A. LATHROP, for himself and
D. M. WESTON.

JUDGES' REPORT ON FLOWERS.

The undersigned, appointed by the R. H. Agricultural Society as Judges to award the prizes on Flowers exhibited for competition at the Annual Exhibition held at Honolulu, on Wednesday, the 30th of July, 1856, beg respectfully to report as follows:

We award to

- No. 15, The first prize, (Mrs. Hillebrand) being No. 114 on the list of premiums, cup or \$10.
- No. 16, The second prize, (Mrs. Hillebrand) being No. 115 on the list of premiums, medal or \$8.
- No. 5, The best Floral Design, (Miss Anna McKibbin) No. 117 on the list of premiums, medal or \$8.
- No. 7, The best Boquet, (Mrs. Wm. Ladd,) No. 120 on the list of premiums, vases or \$5.
- No. 9, The second best Boquet, (Mrs. O. H. Wood) No. 121, boquet holder or \$3.
- No. 1, The best arranged Basket of Flowers, (Mrs. J. H. Wood,) No. 122, boquet holder or \$3.
- No. 3, The second best arranged Basket of Flowers, (Mrs. Stangenwald) No. 123, book or \$3.

No. 11, The greatest variety of Roses, (Mrs. Makee), No. 124, book or \$3.

And we recommend as worthy of a prize, a fine collection of Verbenas, (No. 12, Mrs. Makee) also a vase containing Coxcomb and Double China Pinks, (No. 14, Mrs. Makee.)

All of which we respectfully submit.

WM. FELL,
THOMAS BROWN,
CHAS. F. GUILLOU.

The undersigned take the liberty, after conclusion of the above report, to notice in terms of strong commendation a collection of Flowers, marked No. 20, (Mrs. Everett) which unfortunately arrived after termination of the duties assigned to the Judges. Had it come in time, they have no doubt it would have received a high premium.

CHAS. F. GUILLOU,
THOMAS BROWN.

JUDGES' REPORT ON DOMESTIC MANUFACTURES.

HONOLULU, July 30, 1856.

GENTLEMEN,—The undersigned, Judges on Farming Implements and Domestic Manufactures, at the annual exhibition of this day, beg leave to present their Report.

Before-hand, we wish to express our regrets, at having observed so little competition, nay, in most branches of this department no competition at all. Of a variety of articles, which to our own knowledge are now and have been for years manufactured on these Islands, not any samples were exhibited, such as Arrow Root, Pickles, Cigars, Salt Beef, Salt Tongues, Bacon, Straw Hats, Brooms, &c. Domestic Manufactures of all kinds compose certainly a branch of industry, the development of which is decidedly very desirable and cannot be urged upon the people too eagerly. Surely, in the list of premiums, domestic manufactures are represented in great variety and with great liberality; why then such a limited degree of competition was exhibited to-day, we are unable to explain. May the interest which

the people ought to take in the Society, but which indeed seems to have decreased considerably in this department as well as all others, in comparison with former years, revive henceforth and bring forward at the next show a lively competition, leaving the meagre exhibition of this year far behind.

Of all the farming implements for which prizes have been set apart in the catalogue, we find not a single article exhibited. We are the more pleased, however, to notice several pairs of Ox Bows, a new article, the manufacture of which at these islands was entirely unknown to us heretofore. The Board of Managers, we are inclined to think, were like ourselves, not aware of the manufacture of this article within this Kingdom, and did for this reason not include any premium for Ox Bows in the catalogue. We never supposed that there was any kind of wood on the islands suitable to be worked into Ox Bows, but are now informed that those exhibited were made on Hawaii, from a wood which the natives call *neneleau*, bearing a similarity to the sumac; they have been tried by Mr. Metcalf, who recommends them as very superior, and authorizes us to say that he uses them entirely. They certainly do appear to us very recommendable in shape as well as quality, and we think they are well worthy of the premium of a bronze medal or \$5.

We notice a lot of Niihau Mats exhibited as No. 62; they are the only ones exhibited, and as they are not as superior as we have seen them formerly, we are constrained to withhold the premium.

A very nice sample of domestic manufactured Soap is exhibited, and although there is no competition in this line, we feel bound to recommend for this lot (No. 6,) the premium mentioned in the list: we leave it however to the board of Managers to judge in their discretion about it. The Soap exhibited is certainly a good quality, and if any branch of industry ought to be encouraged, it is the manufacture of this useful and needful article.

Nos. 19, 20, 21, are samples of Salt, of a decidedly good quality; but there is no competition shown, and as we do not think it so very superior to the samples of the article from the same works in former years, we do not feel justified to award the premium. Moreover, we think that the Salt from the same works as the sample exhibited now

(Puuloa) took the premium at last year's exhibition. We may mention that we noticed on the native table several calabashes of Salt, some of which was of very good quality; but the Puuloa will seem to us superior to all of them.

Bread made of Hawaiian flour was exhibited in three different lots, all of which have undergone a fair trial and careful examination by us. It certainly ought to reflect credit upon the respectable bakers if we say that we should have liked to indulge in the consumption of the samples to the full extent of our appetites, had not the duties of our office limited our time and called us elsewhere, much against our wishes. In awarding prizes, we grant the first premium cup, or \$10, to Lot No. 5; the second premium, medal or \$8, to Lot No. 60; and the third premium, medal or \$5, to Lot No. 54.

We mention samples of nice Poha Marmalade, Peach Preserve, Pineapple Preserve and Guava Jelly, but there being no competition we cannot award any premium to either of them.

Of tanned native Goat Skins several samples were exhibited, all of surprisingly good appearance. We award the prize of a bronze medal or \$5, to Lot No. 48—tanned native goat skin finished on the grain.

Of tanned native Cowhides No. 49 takes the premium of a bronze medal or \$5, being two sides of sole leather, which would do credit to any tanner in the old countries.

The lot of Shoes which was exhibited was good, but nothing superior.

We notice a very superior Saddle, manufactured at the Islands, a beautiful piece of workmanship; and although there was no competition, we cannot but strongly recommend to the Board of Managers to award to it a premium of a bronze medal or \$5, as we think it would defy competition anyhow.

Bridle and Bit, both manufactured at these Islands, are certainly excellent, and fully entitled to a premium of \$3 or a book.

We now come to several articles, the manufacture of which is more or less new on the Islands, but bids fair to become a very important branch of industry in the course of time.

No. 78 is a sample of a kind of Meal or Farina, prepared from the

root of the "*Iatropa Uanihat.*" It resembles the tapioca and cassava of the Portuguese. Mr. Oudinot, the exhibitor, informs us that he has prepared a sample lot of about 100 lbs., and that the natives are manufacturing it on Maui in place of arrowroot, its cultivation and preparation being much easier than that of the latter. We are sorry not to have seen any arrowroot on exhibition, to enable us to draw a comparison between the two kinds of meal. Certainly the iatropa meal is worthy of notice, and its preparation ought to be encouraged.

Small samples of *Fecula* (or farina), made from sweet potatoes and from kalo, which are exhibited, are of a very interesting character, and worth mentioning.

We now mention the several samples of Kukui Oil, exhibited in its different stages of refinery. Lot No. 4 is by far the best among them, and we do not hesitate to say that we are of opinion the Board of Managers will do but justice by awarding to this lot a premium. Kukui oil is an article the importance of which is an acknowledged fact. Its manufacture ought to be encouraged, and we are sure whatever quantity will be brought to market will find a ready sale. We notice a small sample of the same kukui oil as this lot, No. 4, refined by a peculiar process of Dr. Frick's.

We see two boxes of Indigo, exhibited by Dr. Frick, and take the liberty to seize this occasion to make some remarks in regard to this article, which, we regret to say, may perhaps in some degree darken the favorable light in which the manufacture of this Indigo has appeared up to this time. We would say that samples of this same Indigo, manufactured last year, were at the special request of Dr. Frick, forwarded to Hamburg for examination, and the result has been anything but satisfactory. We only mention here that it was pronounced to be an article somewhat resembling the Indigo, but far from being Indigo itself; the article had no value at all in the market of Hamburg, where large quantities of real Indigo are bought and sold during the year. Not to discourage however the bold pioneer of the Indigo manufacture on these islands, we will state that there are now on the way to the islands in the brig "Emma," a few seroons of good Guatemala Indigo, as a sample, to furnish us with an

idea of what good Indigo is. We ourselves do not in the least profess to be judges of Indigo; in the above we only quoted the communications of our friends in Hamburg, whose knowledge of the article is beyond doubt.

A very fine sample of Cotton was received at the Exhibition after most of the Committees of Judges had already finished their work and left the rooms. By leave of the President we will make a few remarks about it. It is certainly a very superior article, very white, of long staple and very soft. If such Cotton can be produced on the islands, and the fact lies now before us—its cultivation ought certainly to be promoted in every possible manner. Mr. Oudinot, the exhibitor, informs us that hitherto he has cultivated only a small quantity as a trial experiment. He speaks very favorably of the Cotton trees found on Maui, and feels confident that planters could pick for five successive years from the same tree without any decrease in the quantity or quality of the Cotton.

We recommend this branch of domestic produce to the special attention of the Board of Managers.

Respectfully submitted,

GUST. REINERS,
W. A. ALDRICH,
H. S. HOWLAND.

JUDGES' REPORT ON EMBROIDERY.

The Committee on Embroidery would respectfully report that the specimens placed before them for examination were very few, and they find less difficulty in coming to a decision than in former years.

We award a premium of \$3, for each of the following:

A wrought Collar, marked No. 1, (Miss Gilson.)

A bunch of Flowers wrought from the feathers of the Albatross, (Miss Montgomery.)

An ornamental Work-box, with bouquet of leather flowers, (Mrs. Melchers.)

Pair knit Stockings, (Madame Judd.)

The Committee have to regret the fewness of articles exhibited,

and would state that only in the first premium awarded was there any competition.

H. M. WHITNEY,
EDUARD MOLL,
JOHN LADD.

HONOLULU, July 30, 1856.

JUDGES' REPORT ON COFFEE.

The undersigned Judges on Coffee, beg to report as follows :

There were four samples of Coffee shown—Nos 17, 34, 39, and 40.

To No. 39, for a bag of Coffee, sample of over 2000 lbs, purchased by P. Cumings from natives in Kona, Hawaii, and shown by Aldrich & Bishop, we would award the first premium, but it is a question whether it comes within the rules of the Society for us to do so, and we beg to refer it to the Society or the Board of Managers to decide.

To No. 17, two bags, about 100 lbs., sample of about 5000 lbs., shown by Rev. T. E. Taylor, of Kona, Hawaii, we award the second premium. We do not know whether the Coffee was raised by the exhibitor or not, and therefore the same question would arise as in the foregoing.

No. 40, was a bag of good Coffee from the plantation of Charles Hall, of Kona, Hawaii, taken indiscriminately from a large quantity; not as well cleaned as the samples 39 and 17, and said to be inferior to the general run of his entire crop.

No. 34, a box containing about 30 lbs., (less than the quantity required by the rules) sample of 3000 lbs., exhibited by Benj. Pitman, as a specimen of Hilo Coffee, and not for competition. It was very even in size and color, and well cleaned, and much superior to that usually received from Hilo.

It would be pleasing to those who take an interest in the Society, and to those who exhibit Coffee, if all the producers would send samples to the Fair.

Respectfully submitted,

CHAS. R. BISHOP,
B. PITMAN.

JUDGES' REPORT ON SHEEP AND SWINE.

To the President of the R. H. Agricultural Society:

SIR,—Your Committee to act as Judges of the comparative merits of Sheep and Swine exhibited at the Fair to-day, beg leave to report,

That they have awarded as follows:

- Premium No. 26, South Down, "Boki," (Cummins.)
 30, Native, numbered 30, (Moffitt.)
 31, two Merinos, " 31, (Sparks.)
 32, 3 Fleeces, " 26, (Moffitt.)
 33, Boar, " 33, (Meek.)
 35, Sow, " 35, (Meek.)
 37, to the interesting family of 35, (Meek.)

Your Committee would say that there were two Swine in the pens that were not beat by any on the grounds, but as we are limited by our instructions to "imported" Swine, the beautiful Berkshires of Captain Meek can only receive our highest commendation. They are an honor to 35, and 37 will not fall far below them.

Several fine wethers from Hawaii, exhibited by Mr. F. Spencer, were noticed, which we judge to be of fine quality.

HENRY PRENDERGAST,
 W. GOODALE,
 P. J. GULICK.

REPORT OF COMMITTEE ON GRAIN, SEEDS, AND FIELD-CROPS.

HONOLULU, July 30th, 1856.

Mr. President and Gentlemen of the R. H. A. Society:

Your Committee to whom was assigned the duty of deciding upon the merits and awarding premiums for the best Grains, Seeds and Field-crops, offered for premium this day, would respectfully report and award as follows:

GRAINS AND SEEDS.

Best sample of wheat, No. 97, (Kekaha.)

2nd best do., No. 93, (Gower.)

Best 20 ears Indian corn, No. 44, (Archer.)

Best bushel of Indian Corn, No. 1, (Knudsen.)

Best white beans, No. 87, (Gower.)

Best variety of do., Nos. 87 and 92, (Gower.)

Your Committee have noticed with pleasure, and would recommend to the favorable notice of the Society, a specimen of China sugar-grass, exhibited by Dr. W. H. Hillebrand, which has lately been introduced into the United States, Demarara, &c., with prospects of advantage to individuals and nations.

Your Committee learn with regret that the drought of the present season has so shortened the crops in the principal grain growing districts, as to prevent farmers from competing for premiums on crops of wheat, barley, oats, Irish potatoes, broom-corn, &c., in accordance with the terms stipulated by the Committee of Management.

They also regret feeling that these terms have not been sufficiently complied with by Mr. Archer, of Waimea, Kauai, who has entered the list of competitors for the premium on the best field of tobacco, but having failed to comply with the terms of the Board of Managers, your Committee can only recommend his specimen to the favorable notice of the Society.

For the best crop of Indian corn, we take pleasure in awarding the premium to Mr. Knudsen, of Waiawa, Kauai, who has not only furnished a specimen of superior corn, but also the required certificate, and detailed account of cultivation, cost of production, &c. &c.

Respectfully submitted.

J. H. WOOD,

R. ARMSTRONG,

Committee.

JUDGES' REPORT ON FRUITS AND VEGETABLES.

HONOLULU, July 31, 1856.

Mr. President—Gentlemen:

Your Committee whom you entrusted to award premiums for the best samples of fruits and vegetables, beg leave to state that they regret to find their duty so easy, on account of the small variety ex-

hibited. They wish also to state that the natives deserve, in their opinion, great credit for their successful efforts to compete with foreigners.

We found the following numbers only to be entitled to premiums, viz :

73—Best and greatest variety of vegetables raised by exhibitor, Silver Cup or \$10, to Jas. Makee.

74—2nd best do. do., Silver Medal or \$8, to F. A. Oudinot.

75—Best sweet potatoes, from foreign seed, Silver Medal or \$8, No. 89.

76—Best 10 heads kalo, Bronze Medal or \$5, No. 83.

80—Best 12 white table turnips, Book or \$3, No. 66.

81—Best 12 carrots, do. do. No. 8.

82—Best 6 table beets, do. do. No. 10.

83—Best 12 radishes, do. do. No. 67.

92—Best 3 squashes, do. do. No. 3.

93—Largest squash or pumpkin, do. do. No. 3.

96—Best variety of potatoes, do. do. No. 89.

FRUITS.

99—Best dish of grapes, Bronze Medal or \$5, No. 80.

103—Largest watermelon, Book or \$3, No. 15.

108—Best bunch bananas, do. do. No. 85.

109—2nd best do. do. or \$2, No. 82.

Your Committee were much gratified in noticing specimens of pie-melons, cocoa, &c., for which no premiums were offered, and it is presumed none expected, but offered as evidence of interest in our institution and exhibition.

We conclude our report with the remark that the exhibitors of pomegranates and dates, should be rewarded for offering those fine fruits.

E. HOFFMANN,

J. H. WOOD.

JUDGES' REPORT ON MISCELLANEOUS ARTICLES.

The Committee on Miscellaneous Articles exhibited at the Fair have found their duties circumscribed within a narrow compass.

Indigo and Saddlery, which the "Miscellaneous Committee" of last year had under consideration, were this year more properly referred to the committee charged with the examination of domestic manufactures. Flour naturally fell under the cognizance of the same committee.

Some very fine fleeces of wool were exhibited, well entitled to the premium which we understand another committee—that on Sheep and Swine—has awarded. The enterprising wool-growers of the Islands are sure, in the end, to meet a proper reward.

The excellent cotton exhibited by Mr. F. A. Oudinot, of Lahaina, has also been properly judged and commended in another quarter. It may not, however, be out of place for us to observe that in our estimation, the production of cotton deserves more attention than has heretofore been bestowed upon it. There are many reasons to believe that it might easily be rendered one of the leading staples of the kingdom.

The indigenous cotton tree of the Islands is perennial, but, according to Mr. Oudinot, age diminishes the fineness of the texture of its product.

This is evident from the specimens he has presented, taken from trees respectively of five months, one year, two and a half years, and fifteen years' growth. Between five and six months only are requisite at Lahaina for producing a crop, and when the tree begins to bear, it is ever displaying at the same time its flowers and opening its matured bolls. It is supposed that a single acre of ground will, under ordinary circumstances, produce at least one thousand pounds of cotton in the course of a year. This is said to be considerably beyond the production of an acre in the United States, where the plant is annual.

The specimens we have examined will compare favorably with the best Sea Island cotton produced.

Mr. Oudinot deserves much credit for his energy, and if he perseveres in his laudable efforts he will, no doubt, not only pave the way for his own fortune, but open the road of fortune to others.

The encouragement of cotton production is an object worthy of at-

tion by the Government and by the agricultural societies of the kingdom, and we hope to see hereafter a greater amount of interest displayed in it.

These brief references may perhaps be considered as an encroachment upon the field of duty assigned to others, but we hope no "miscellaneous" or special offense will be taken on account of our very moderate and unobtrusive effort to reclaim a few subjects of jurisdiction, which, until "after the fair," we supposed peculiarly vested in the Committee on Miscellaneous Articles.

It only remains for us to submit a few observations in regard to a couple of articles falling, *beyond all doubt*, under our proper notice. This we conclude, because we have not heard of their reference to other committees.

The gold fishes exhibited by Dr. Judd were old acquaintances; they met with favor from all who saw them, and if they cannot receive a premium, they deserve—what they abundantly secured—admiration.

The koa board, eight feet in length by three feet four inches in breadth, exhibited by Mr. J. L. Merritt, of Maui, attracted much attention. Mr. Merritt informed us that some of the middle boards from the same cut of the tree were at least four inches wider. There is no handsomer wood in the world for cabinet work than the koa; and the public was no doubt pleased to see so fine a specimen of it presented for examination.

We are not aware of any thing among the "miscellanies" of the Fair which require from us an expression of opinion. There are apparently no premiums for us to award, although perhaps by our own assumption, there have been some merits to discuss. We do not regret that the sphere of our duties has been limited, for we are sure that "abler and better men" have judged more satisfactorily than we could have done of matters heretofore confided to the Committee on "Miscellaneous Articles."

Respectfully submitted.

DAVID L. GREGG,

R. C. WYLLIE,

GUST. C. MELCHERS.

HONOLULU, July 30, 1856.

JUDGES' REPORT ON POULTRY.

The exhibitions in this Department were very few, but the Committee agree in awarding a premium to each of the following:

- No. 11, a Cock and two Hens, (H. G. Crabb) bronze medal or \$5.
- No. 3, a pair of Muscovy Ducks, (M. C. Monsarrat) book or \$3.
- No. 2, a pair of Geese, (G. Melchers,) book or \$3.

Respectfully submitted,

EDWARD SPARKS,
JOHN LADD,
H. M. WHITNEY.

From the preceding reports, the following Synopsis of Premiums will show at a glance the articles which took premiums, and the persons to whom they were awarded.

LIST OF PREMIUMS AWARDED IN 1856.

- J. Meek, best imported Bull, cup, or \$15.
- C. G. Hopkins, best native do., silver medal, or \$8.
- C. G. Hopkins, 2d best do. do., bronze medal, or \$5.
- C. G. Hopkins, best native Cow, silver medal, or \$8.
- R. Armstrong, best fat Ox over four years, bronze medal, or \$5.
- C. G. Hopkins, best do. Steer, under do. do., bronze medal or \$5.
- J. Meek, best imported Stallion, "Oregon," certificate.
- J. Meek 2d best do. do., "Glencoe," silver cup, or \$10.
- S. P. Ford, best native Stallion, "Democrat," cup or \$10.
- P. J. Gulick, 2d best do. do., "Young Oregon," silver medal or \$8.
- T. Cummins, best native mare, "Scarlet Feather," silver medal or \$8.
- T. Cummins, 2d best do. do., "Jilt," bronze medal, or \$5.
- J. Meek, best one year old Mare, "Fanny," book, or \$3.
- R. Moffitt, best native Gelding, "Emerald," bronze medal or \$5.
- P. J. Gulick, best pair horses in harness, cup, or \$10.
- T. Cummins, best imported Ram, "Boki," cup or \$10.
- R. Moffitt, best native do., bronze medal, or \$5.
- E. Sparks, best two Merino Ewes, book, or \$3.

- R. Moffitt, best three Fleeces, bronze medal, or \$5.
 J. Meek, best imported Boar, bronze medal, or \$5.
 J. Meek, best do. Sow, bronze medal, or \$5.
 J. Meek, best lot of Pigs, bronze medal, or \$5.
 E. Sparks, best Butter, 3 firkins, cup, or \$10.
 H. A. Widemann, 2d best do., bronze medal, or \$5.
 E. Sparks, best Cheese, bronze medal, or \$5.
 E. M. Plantation, best 100 lbs. Sugar, silver cup, or \$15.
 Lihue Plantation, 2d best do., cup, or \$10.
 Brewer Plantation, best Syrup, silver medal, or \$8.
 P. Cumings, best 75 lbs. Coffee, cup, or \$10.
 T. E. Taylor, 2d best do. do., silver medal, or \$8.
 Kekaha, best sample of Wheat, cup or \$10.
 J. T. Gower, 2d best do., medal, or \$8.
 A. Archer, best Corn, 20 ears, bronze medal, or \$5.
 V. Knudsen, best bushel do., bronze medal, or \$5.
 V. Knudsen, best crop do., silver cup, or \$10.
 J. T. Gower, best peck of White Beans, bronze medal, or \$5.
 • J. T. Gower, best variety of do., bronze medal, or \$5.
 J. Makee, best variety of Vegetables, cup or \$10.
 F. A. Oudinot, 2d best do. do., silver medal, or \$8.
 F. A. Oudinot, best Sweet Potatoes foreign seed, silver medal, or \$8.
 F. A. Oudinot, best 10 heads of Kalo, bronze medal, or \$5.
 J. Makee, best 12 white Turnips, book, or \$3.
 H. Stangenwald, best 12 Carrots, book, or \$3.
 J. Makee, best 12 Radishes, book, or \$3.
 L. Andrews, best 6 Beets, book or \$3.
 W. Goodale, best 3 Squashes, book, or \$3.
 W. Goodale, largest Squashes or Pumpkins, book, or \$3.
 F. A. Oudinot, greatest variety of Potatoes, book, or \$3.
 F. A. Oudinot, best Grapes, bronze medal, or \$5.
 S. C. Damon, largest Watermelon, book, or \$3.
 F. A. Oudinot, best Bananas, book, or \$3.
 F. A. Oudinot, 2d best do., book, or \$2.
 Mrs. Hillebrand, best variety of Flowers, cup, or \$10.
 Mrs. Hillebrand, 2d best do. do., silver medal, or \$8.

- Miss Anna McKibbin, best Floral Design, silver medal, or \$8.
 Mrs. Wm. Ladd, best Boquet, vases, or \$5.
 Mrs. O. H. Wood, 2d best do., boquet holder, or \$3.
 Mrs. J. H. Wood, best basket of Flowers, boquet holder, or \$3.
 Mrs. Stangenwald, 2d best do. do., book, or \$3.
 Mrs. Makee, greatest variety of Roses, book, or \$3.
 Mrs. Makee, best collection of Verbenas, book, or \$2.
 Mrs. Makee, best do. of Coxcombs and Pinks, book, or \$2.
 Mrs. B. Judd, best knit Stockings, book, or \$2.
 Miss Gilson, best crochet Collar, diploma, or \$2.
 Miss Montgomery, best wrought Flowers, diploma, or \$2.
 Mrs. Melchers, best leather Flowers, diploma, or \$2.
 M. R. Packer & Co., best Soap, bronze medal, or \$5.
 C. Brenig, best Bread, cup, or \$10.
 M. J. Armstrong, 2d best do., silver medal, or \$8.
 C. A. Hall, 3d best do., bronze medal, or \$5.
 J. H. Wood, best tanned native Goat skins, bronze medal, or \$5.
 J. H. Wood, best do. do. Cowhide, bronze medal, or \$5.
 Robinson & Hughes, best Saddle, bronze medal, or \$5.
 Robinson & Hughes, best Bridle, book, or \$3.
 H. A. Widemann, best Kukui Oil, silver medal, or \$8.
 H. G. Crabb, best Cock and 2 Hens, bronze medal, or \$5.
 M. C. Monsarrat, best pair Muscovy Ducks, book, or \$3.
 G. C. Melchers, best pair Geese, book, or \$3.

THURSDAY, July 31, 1856.

The Society met at the Court House at 10 o'clock.

The Reports of Standing Committees were received, and that upon Bees elicited some discussion, whereupon, it was

Resolved, That the Board of Managers be instructed to attempt to procure Bees, from such parts of the world as may seem to them feasible.

The Reports of Standing Committees were referred to the Board of Managers, to be printed at their discretion. E. O. Hall, Wm. Hillebrand and J. H. Wood were appointed a Committee on printing.

After a discussion of the subject, it was

Resolved, That the Board of Managers be instructed to procure a Room for the use of the Society, the deposit of its Library, and other purposes; Provided the same can be procured for a sum within the means of the Society.

Mr. Wm. Fell, of San Francisco, was elected a corresponding member of the Society.

The business of the Society having been concluded, adjourned to meet again at the call of the Board of Managers.

The following are the Reports of the Standing Committees appointed in 1855, to report to the Society at its meeting in 1856.

REPORT ON SUGAR.

HONOLULU, July 30, 1856.

To the President of the R. H. Agricultural Society:

DEAR SIR,—In the absence of the Chairman of the Committee on Sugar, etc., it has unfortunately fallen to me to make the report.

As I am not aware that any improved methods either of cultivation or manufacture of sugar cane have been discovered within the last year, I shall only make a brief statement of the amount of the sugar crop for the present year, and the prospects for the next crop, so far as I can ascertain. In the crop for 1856, is included all manufactured in November and December of 1855.

On Hawaii there are two sugar plantations, both at Hilo, the one belonging to Acho, and the other to C. P. Samsing & Co. The last crop of the former was 110 tons, and the next crop will be about as much. From the latter the crop was 70 tons, and owing to the difficulty in getting labor at Hilo, Messrs. Samsing & Co., have, I understand, abandoned the business.

On Maui there are three plantations; the two principal ones, the "East Maui" and the "Haliimaile" at Makawao, and the other at Hana. Those at Makawao are in good hands, under excellent management, and have every appearance of being profitable now, and promising for the future.

The present crop of the "East Maui" will, when all in, be about

170 tons, yielding an average of one and one half tons per acre, and the next year's crop will it is thought be about the same. On the "Haliimaile" or "Brewer" plantation, cultivation has been much neglected for some time past, so that there will be no crop next year. The present crop will, I am told, amount to about 80 tons. This place has recently changed hands, and is the property of gentlemen of capital and enterprise, and will undoubtedly be carried on energetically and properly. Of the plantation at Hana I know nothing except that some syrup has been made there during the last year, but how much I do not know.

The proprietors of the two plantations on Kauai, the "Koloa" and the "Lihue," (and especially those of the "Lihue") have had much of hard fortune to contend with, in the way of droughts, etc. At Koloa quite extensive and thorough experiments have been tried in planting cane upon dry, thin-soiled uplands, and have resulted in a failure, the last crop amounting to scarcely 50 tons. The uplands have been abandoned, and the cultivation is now confined to the rich lowlands and the borders of a large marsh recently drained. The young cane is said to be very large and handsome, and affords almost a certainty for a crop of 200 tons in 1857; and the superintendent estimates the crop for 1858 at 450 tons from 310 acres, which, considering the quality of ground, is not perhaps too much to expect.

At Lihue the last crop yielded 94 tons, and the next crop would have been considerably more had not the dry weather set in earlier than usual, but now it is impossible to say what it will be. The proprietors are relying upon irrigation to save them from the effects of drought, and had not the weather been unusually dry during the last winter months, the water would have been upon the fields several weeks ago, in time to have benefited the present crop materially; but, in consequence of the lowness of the streams originally relied upon, the water "lead" has had to be extended to a large and constant stream, which will make the lead in all its windings about nine miles in length. Should this experiment work well, and have the effect anticipated, fair crops will henceforth be almost certain.

As nearly as we can ascertain, the entire crop for 1856 is 574 tons sugar, and about 4300 bbls. molasses, and the crop for 1857 will

probably be about 530 tons sugar, and 3600 bbls. molasses; and from present appearances, the crop for 1858, will be much larger than either.

The Reciprocity Treaty negotiated between the United States and Hawaiian governments, had not, at latest dates, been ratified, but considering the assurances that have been made, we cannot doubt that it will be, before the adjournment of the present Congress. The operation of that Treaty would no doubt benefit agriculturists generally, and give an impulse to the sugar planting that is greatly needed in order to keep up the hopes of those already in the business, and to induce the establishment of new plantations.

Native labor is more easily procured than it was in the years 1849 to 1853, when the produce trade with California was brisk and profitable, but still there is a scarcity, and the quality is poor.

Owing to the quarrelsome dispositions and mischievous habits of the coolies, they are not as much employed on the sugar plantations as they were two or three years ago.

Respectfully submitted, by

CHAS. R. BISHOP.

DISCOURSE ON COFFEE.

Read before the R. H. Agricultural Society.

Upon the important subject of Coffee planting in the Hawaiian Islands, all that can be said will be found in the six published numbers of the Society. The essay of Mr. Godfrey Rhodes, page 54 of No. 2, for 1851—his further remarks at page 67 of No. 3, for 1852—the essays of Mr. William Duncan and of Dr. Newcomb, on Worms and Insects, page 71 and 94, respectively, of the same Number—the remarks of Mr. Rhodes on Worms and Caterpillars, page 61 of No. 4 for 1853—the replies to 21 questions by Mr. Wyllie of Dr. Rooke, of No. 1, vol. 2d, for 1854, page 30—of Mr. Rhodes, page 32—of Mr. Pitman, page 37—of Mr. P. Cummings, page 38, and of Mr. S. Reynolds, page 41 of the same Number, if carefully read, will afford nearly all the information that the planter can desire.

In view of information so abundant and varied, the planter can be

at no loss to form good practical rules for the management of his estate. To reduce them into successful practice will depend upon his own diligence, industry and perseverance, his facilities of obtaining a proper supply of money and of labor, and his judgment in applying these advantages to the most useful purposes.

That Coffee planting, with very few exceptions, has hitherto been unprofitable is undeniable; but so was cotton planting in the United States, for upwards of thirty years; by hard labor and perseverance, the Americans overcame difficulties that appeared to be insuperable; and they have now made cotton the greatest staple of their country. By similar means Coffee may be made, not the greatest staple of the Hawaiian Islands, but one of its greatest.

The superior flavor of Hawaiian coffee is now an ascertained fact; instances of individual trees producing 12, 20, and even 30 pounds, are recorded in the previous reports of the Society. By the concurrent testimony of several practical men, two pounds of coffee may be calculated upon as the average of each tree, on an estate. No other proofs are wanting to prove that our soil is well adapted to the growth of the coffee tree.

But the important question remains—can we produce coffee at such a price per pound, as to afford us a security that we will always have a market for it? To solve this question a table is appended, shewing what duties are levied on coffee, by the tariffs of those countries with which we have, or are likely to have mercantile relations, and the price of coffee per pound, in each of such countries, taken from the latest prices current that it has been possible to procure. That table seems to warrant the inference that so long as coffee can be placed on board, here, at say seven cents per pound, we will seldom or ever want a foreign market, either in the United States or Europe, to which it can be exported at some profit, on that price. Whenever that profit may exceed the gain on bills of exchange (and of late exchange has been unfavorable to the buyer) foreign merchants will prefer coffee as a return for their goods imported, to bills of exchange.

By reverting to the communications on coffee, which are referred to above, it will be found that while Dr. Rooke estimates 4 cents per

pound as the average cost of production, Mr. Rhodes values it at 6½ cents. It would seem to be fair, between the two authorities, to take 5½ cents per pound as the mean. Now, if we can raise coffee at 5½ cents per pound, and sell it at 7 cents, we would have a profit of 1¾ cents per pound, and so in proportion for every additional cent that we may obtain in price. So long as coffee continues at the prices that have for many months ruled in San Francisco, it cannot be doubted, that coffee plantations, not burdened with an excessive amount of sunk capital, will leave a large profit.

The fact has been ascertained that of late years, the ratio of the increase in the consumption of coffee, has exceeded the ratio of the increase of its production. Just in proportion as people diminish their use of intoxicating stimulants, will the consumption of non-intoxicating stimulants increase; of these coffee is by far the best, and as the spirit of the age tends every where against intoxication and its concomitant vices, it is but reasonable to believe that the demand for coffee will increase from year to year. The probability is that the price will gradually rise in the chief markets of the world; and that it will more frequently be above 10 cents per pound than under that price.

If coffee houses, supplied with the newspapers of the week, and other interesting reading matter, on an humble scale, could be introduced generally among the natives, it would wean them from their present fondness for intoxicating beers and other inebriating compounds—elevate their character in a moral point of view, and create a home market for coffee perhaps to the extent of 100,000 pounds annually. The establishment of coffee-houses in England, had a perceptible effect in diminishing the frequency of inebriety; and their multiplicity in Turkey, perhaps even more than religious scruple, enables the Mussulman to obey the injunction of the Prophet, which inculcates abstinence from beverages having an intoxicating effect.

The want of capital to foment the extension of coffee cultivation continues to be as great an obstruction as ever; but increased production, with greater foreign and domestic demand, will command capital; and as the Honorable David L. Gregg has truly observed in his admirable address to the Society in 1854, *capital will command efficient labor.*

There is reason to believe that the want of labor is less severely felt now than it was several years ago; that the wages of natives and of coolies including their food, does not exceed 33 cents per day; and that it is cheaper than slave labor in the United States, if Mr. Pease was right in stating it at the average of 37½ cents day, as he did in his essay of 1850,—see page 63 of Report No. 1, volume I. If Mr. Pease did not include, in his calculation, the interest on the value of the slave, the difference will be still greater in favor of such labor as we can procure in these islands.

From all that has been said, the inference is warranted that with good and economical management the prospects of coffee planters in this Kingdom, are encouraging.

R. C. WYLLIE.

Foreign Office, July 22d, 1856.

TABLE.

Shewing the duties on Coffee per pound, as fixed in the Tariffs of different countries up to 1855, and the prices, in those countries, per pound, both duties and prices reduced to cents.

By Tariff of	Duty.	Current Prices.	General Remarks.
United States,	Free.	10¼ to 11c pr lb.	Such in New York June 5.
	"	13 to 13½ "	In San Francisco, July 1.
Belgium,	about 1c pr lb.	Believed to be abt the same as Ham- burg.	Consumption great in US. Consumes largely : Coffee from Dutch E. I. pays less duty than other foreign.
British,	" 6c pr lb.	8½ to 14½ cts.	Consumption increasing.
New South Wales,	" 1½c "	13 to 16	Do. do.
Victoria,	" 2c "	About the same.	Do. do.
Van Dieman's Land,	" 3c "	" "	Do. do.
South Australia,	" 1¼ "	" "	Do. do.
New Zealand,	less than 1c pr lb.	" "	Do. do.
Denmark,	about 1½c "	Not known.	
France.	" 9c "	" "	When imported in foreign vessels.
Hamburg,	½ pr ct, <i>ad valorem</i>	6 2-3 to 13c.	Vast quantities of Coffee pass through Hamburg & Bremen on the invoice val- ue with the addition of fr't and insurance.
Bremen,	¾ pr ct, "	About the same as Hamburg.	
Norway,	about 2½c	Not known.	
Sweden,	" 2½c	" "	
Russia,	" 8½c	" "	
Zollverein,	" 3c	" "	

The Zollverein comprises — Prussia, Saxony, Bavaria, Wurtem-

burg, Hesse Cassel, Hesse Darmstadt, Hesse Homburg, Baden, Nassau, Oldenburg, Brunswick, Saxe-Wiemar, Saxe-Coburg, Saxe-Meinengen, Schwarzburg-Rudolstadt, Schwarzburg-Sondershausen, Anhalt, Lippe-Deimold and Schaumburg-Lippe, Waldeck, Reus, Frankfort on the Maine, and Luxemburg.

In this table, no note is taken of the Republics of South America, because though adjacent to us, all of them on the Pacific coast, except Chile, produce Coffee, and we cannot calculate upon them as markets for our consumption.

R. C. WYLLIE.

Foreign Office, 22d July, 1856.

REPORT ON INTER-ISLAND NAVIGATION.

Vessels propelled by steam or other equivalent locomotive power, are the only ones fit to carry on the trade between our Islands so as to develop all their resources. Cattle cannot be transported with economy and safety except by steam vessels, combining the advantages of spacious deck, small draft of water, and quick transit. Fruits and other useful vegetables, from remote islands and places, cannot reach Honolulu, the chief market for consumption, in a state fit for use, unless conveyed in steam vessels; nor can any other vessel safely anchor and embark produce at those many places where anchorage exists, and where landing is practicable, along the coasts of all the Islands. Mr. Metcalf has stated that there are scarcely ten continuous miles of coast any where along the shores of the Islands, where such facilities of anchoring and landing are not to be found.

If we possessed steam vessels passing round the Islands and calling at the chief of those places all along their coast, it is impossible to say how much traffic might be created, and how much the industry and wealth of the Islands would be promoted.

The report of Mr. Prendergast is added, because, as that of a practical man, speaking from actual experience, although under most adverse circumstances, it is of great value. If the results from steam navigation with such steamers as we have had have been such

as he represents them, (and we have no reason to doubt his statements,) what will the results be of steam navigation when we have suitable vessels ?

At the first introduction of steam vessels and railroads, they have every where been opposed by men wedded to the existing state of things, and sceptical as to the results of all improvements. Every where there are men—good and conscientious men, too—who are of that timid, doubting temperament. We have them here; they oppose the introduction of steam navigation upon the ground that all the traffic of the Islands will not pay their expenses. Precisely such were the arguments used against the first proposals to introduce steam vessels into the British Australian Colonies; yet by their introduction, not many years ago, traffic so much increased and so rapidly, that in 1855, the following steamers were employed between the port of Sydney and others in that country.

LIST OF STEAMERS Trading to and from the Port of Sydney, with their capabilities, and the trade in which they are engaged.

NAMES.	TONS.	Horse P'w'r.	Trading to.
Yarra Yarra,	526	200	Wide Bay.
Waratah,	380	140	Melbourne.
City of Sydney,	735	180	do.
Wonga Wonga,	735	180	do.
Hellespont,	330	80	Laid up.
London,	686	380	do.
Governor General,	686	450	do.
Telegraph,	468	150	Melbourne.
Illalong,	150	60	Hunter River.
Hunter,	250	120	do.
Collaroy,	328	150	do.
Tamar,	200	60	do.
Ben Bolt,	234	110	Laid up.
Paterson,	310	120	Hunter River.
Williams,	300	120	do.
Eagle,	224	80	Refitting.
City of Melbourne,	180	33	New Castle.
William Misikin,	124	43	Laid up.
Boomerang,	324	66	Moreton Bay.
William IV.,	84	20	Port Macquarie.
Grafton,	315	100	Clarence River.
Illawarra,	233	80	Wollongong.
William Denny,	595	200	Auckland.
Tasmania,	452	240	Hobart Town.
Nora Creina,	140	85	Shoal Haven.
Black Swan,	40	45	Brisbane Water.
Pelican,	70	35	Paramatta.
Shamrock,	394	100	Moreton Bay.
Rose,	276	100	Repairing.
Thistle,	276	100	do.
Emu,	72	30	Paramatta.
Pluto,	104	40	Manning River.
Kiama.	104	60	Kiama.
Gipsey,	93	36	Manning River.
Meteor,	128	75	

The following steamers ply to the various settlements in the harbor of Port Jackson:

Names.	Tons.	Horse power.	
Planet,	90	40	
Brothers,	23	12	
Ferry Queen,	8	3	
Waterman,	17	8	
Gipsey Queen,	6	6	
Pet,	6	4	
Victoria,	107	60	
Washington,	102	120	} Towing } vessels.
Huntress,	110	60	
Herald,			
Star,	35	23	

The experiment in British Australia has been so very successful that while in 1853 there were registered 24 steamers, in 1854 there were registered 43. Nor has this increase been found sensibly to diminish the number of sailing vessels engaged in the coasting trade. In 1853, 948 sailing vessels were engaged in that trade, and in 1854, 947 vessels were registered as engaged in this same trade. The tonnage of sailing vessels and steamers taken together, in 1853 was 76,397, and in 1854 it was 131,234.

It has been so with the coasting trade of Great Britain and Ireland, notwithstanding the confident predictions made in Parliament that the introduction of steamers would entirely supersede the use of sailing vessels in that trade.

In 1853 there entered and cleared coastwise 98,717 sailing vessels, tonnage 7,900,851, and 11,708 steamers, tonnage 2,773,444, in England. In Scotland, 14,484 sailing vessels, tonnage 886,233, and steamers 4,617, tonnage 1,018,037. And in Ireland 18,101 sailing vessels, tonnage 1,417,465, and steamers 4,860, tonnage 1,484,827. In 1854, there entered and cleared coastwise in England 95,545 British sailing vessels, tonnage 7,554,934, and 297 foreign sailing vessels, tonnage 43,778—also 12,782 steamers, tonnage 3,106,396. In Scotland, 13,739 British sailing vessels, tonnage 856,305, 52 foreign sailing vessels, tonnage 3,996, and 4,879 steamers, tonnage 1,075,388. And in Ireland, 17,414 British sailing vessels, tonnage 1,305,001, and 1 foreign sailing vessel, tonnage 108—also 4,751 steamers, with 1,428,435 tons burden. The total number of men employed in 1854, exclusive of masters, was 162,416.

It will of course be understood that the above numbers do not represent so many distinct vessels, but the number of vessels entered and cleared, and that the same vessel enters and clears often, in the coasting trade, during the year.

It is not to be doubted that in this kingdom, when proper steam vessels are properly established, their existence will be found quite compatible with the interests of the owners of sailing vessels engaged in the coasting trade. The effect at first sight would appear to be otherwise, but experience every where has proved that steam vessels create traffic, both for themselves and for sailing vessels too.

The able discourse, and the valuable notes added to it, of the Hon. David L. Gregg, read to the Society in 1854, show clearly and eloquently that what we are *now* is nothing compared with what we may become and ought to be. It follows as a necessary consequence, that in all our public works and improvements we ought not to confine our views to our present wants, but to look ahead to our future requirements: of these, one of the most palpable is inter-island steam navigation.

If this be granted, the next question is, what is the best description of steam vessels for us to introduce?

With due deference to the contrary opinion of others, I would prefer propellers and built of iron. They are the most handy, the cheapest, the most durable, and built in distinct compartments, they are the safest.

In 1854 there were built and registered in the United Kingdom of Great Britain 592 timber sailing vessels, tonnage 115,807, and 36 iron sailing vessels, tonnage 16,880, and 22 timber steamers, tonnage 2,090; and no less than 152 iron steamers, with 62,165 tons burden. This fact alone is the best answer that could be desired to all the objections that have been started to the use of iron in the building of ships.

Iron steamers have for more than 15 years been in use between the Clyde and the Mersey; they and iron sailing vessels have made long voyages abroad, and without any accident whatever traceable to variations of the compass.

Among the objections that have been urged against iron vessels, are those variations caused by the mass of iron, the rapid oxidation of the nails which fasten the plates, and the difficulty of keeping the bottom clean. All these have been so overcome by successive inventions and improvements, that many of the ship-owners in Great Britain believe that iron will soon supersede wood in ship building almost entirely.

Mr. John Getty, shipbuilder of Liverpool, has invented a novel mode of using iron in constructing the frames or ribs, or other main parts of ships—chiefly those which are to be planked with wood and require the employment of copper bolts for holding the planks in

place—the main object being to avoid all contact between the iron and the copper bolts, and consequently to prevent a destructive galvanic action being set up between the two metals. To give strength to ships, Mr. Getty plates the opposite sides of the timbers with iron, and secures the plates together by bolts which pass through the iron and the wood, and then he forms compound ribs or frames of considerable stiffness, which will permit of the copper bolts for securing the planks being inserted therein without coming in contact with the iron. For the purpose of facilitating the building of vessels upon this compound principle, he proposes that the breadth of the iron plates shall be, in general, less say by about 2 inches than the depth of the timber to which they are applied, to admit of the ribs being chamfered off to any required angle to suit the curve of the vessel. This mode of strengthening timbers Mr. Getty proposes to employ in constructing the keels and sternposts, frames or ribs, keelsons, sister keelsons, and bilge keelsons, stringers and clamps of ships.

There still remains another important question: Who are to introduce such steamers as we want—the Government or private individuals?

There can be no difference of opinion that it ought to be the latter if they would procure the right kind of steamers and undertake the risk. We have made an experiment of this sort, and have *failed*, because the steamers introduced were not proper sea-going vessels nor suitable to our wants. To obtain them, it appears indispensable that the Government should undertake the expense and the risk of their introduction in the first instance. After proof of their efficiency and of a good profit arising from their operation, the Government would have no difficulty in ceding them, on advantageous terms, to some private association.

In fine, all the republics of South America have steamers running along their coasts; California and Oregon have steamers; the Russian settlements on both Pacific and Asiatic coasts have steamers; China and the Philippine Islands have steamers; the British Australian Colonies have steamers, the French in Tahiti and New Caledonia have steamers; and it will be much to be deprecated if we Hawaiians, with all the advantages of our singular position, and of all

the varied resources of our Islands, remain without steamers, or vessels propelled by other equivalent motive power.

R. C. WYLLIE.

FOREIGN OFFICE, 28th July, 1856.

HONOLULU, 28th July, 1856.

To the Hon. R. C. WYLLIE, Chairman of the Committee on Roads and Inter-Island Navigation:

SIR:—I have received your communication of the 14th present, and although I regret you did not call on one more capable of doing justice to the subject of inter-island navigation, I will endeavor, in a brief report, to set forth my views, supporting them by what statistics I have in my possession.

The *Akamai* arrived here in the fall season of 1853. This steamer of 125 tons register was the pioneer boat sent to fulfil the terms of a charter, granted to G. W. Ryckman and others, for the exclusive privilege of inter-island steam navigation for a term of years. There was a clause in the charter that another new, good, and substantial steamer, of not less than 250 tons, should be placed on the route. It is to be regretted such a boat as the *Akamai* should have been the pioneer, as she was in no way calculated for the place she was made to fill, having neither capacity, strength or power to contend with the rough and heavy seas which are constantly met with in the inter-island channels. It was not deemed necessary to send a stronger boat, as it had been represented to the parties interested who sent her, that the passage from one island to the other *was as smooth as a mill pond*. The failure of this boat prejudiced the minds of the native population against steam communication, and gave rise to the opinion that the country was too young and not yet ripe enough for steam; but I shall endeavor to show by the following statistics that the same can be made to pay, and do much to develop agricultural resources, and give the natives an impetus to raise more produce.

With a boat adapted for the trade, cards would be circulated stat-

ing the time of the departure from the different ports for months ahead, and by this means they could calculate on a conveyance of their products to this market from any one of the ports in 12 hours after shipment. How is it now? No time is fixed, the native comes down with his produce some 12 or 15 miles, he finds there is no schooner in port, or she has just left; his merchandise is perishable, he offers it for sale, and sells it for what he can get. He returns to his family in perfect disgust, and says, "what is the use in my trying to raise anything? I cannot get it to market."

The Island of Kauai labors under greater disadvantages than any of the other islands, as a schooner seldom makes the passage in less than three or four days, for she has at all times to beat up against a head wind, where a steamer would make the time in 12 hours. I believe there are instances where schooners have been out eight and ten days.

In October, 1854, I became connected with the Hawaiian Steam Navigation Company, and the company in that month sent over from San Francisco two steamers, the *Sea Bird* and the *West Point*. The *Sea Bird* was a good and substantial boat, and could have been made adapted to the trade. Her boiler was not calculated to burn wood, and the price of coal was then \$30 per ton; a prohibitory price to the profitable running of a steamer, and it was resolved by the owners to withdraw her and maintain the charter with the *West Point*. This boat was unfortunately an old one and much too weak. Her boiler was in a very bad condition, and no calculation could be made on her time. She was finally laid up on the 17th of May, 1855, and with the advice of the owners I had her strengthened, and she received her new boilers in November of that year, making her first trip on the 20th of that month, and running regularly alternate weeks to Maui and Kauai, until she was lost on the morning of the 5th of January, of this year, at Koloa.

The following statement of receipts and expenditures is the best argument which I can bring forward to show clearly that a steamer will pay, as there is a balance of \$2,259 94 to her credit.

Receipts and Expenditures of steamer "West Point" for 46 days, from 20th Nov., 1855, to the 5th of Jan., 1856.

RECEIPTS.

Trip No. 1, to Kauai,	\$554 74
" 2, Maui,	361 92
" 3, Kauai,	777 78
" 4, Maui,	265 14
" 5, Kauai,	518 66
" 6, Maui,	431 70
" 7, Kauai, (lost,)	1,350 00
	<hr/> \$4,259 94

EXPENDITURES.

Pay roll of captain, officers and crew for 46 days,	\$889 00
Fuel for 7 trips, wood \$4 per cord,	800 00
Stores, &c.,	311 00
	<hr/> \$2,000 00

Balance to Credit of boat, \$2,259 94

I know it is supposed by many that a steam communication between the islands would ruin the present coasting trade, but strange to say, it has not that effect wherever it has been tried. In Great Britain and the United States where steam communication has been introduced, it invariably has increased general Trade and traffic, and the coasting trade with sailing vessels has also been benefited. This is a matter of statistics.

For a boat suitable for inter-island navigation, I should recommend a side-wheel boat, of about the following dimensions: length 160 feet, beam 28 do., depth of hold 10 do., tonnage about 400 tons; size of engine, 34 inch, 9 feet stroke; diameter of wheel, 24 feet, 5½ feet face; walking-beam engine, with a boiler adapted to burn wood or coal; draft, 8 feet.

I know there are many residents who think a propeller the most desirable, but the short limits of a report will not allow a discussion of the relative merits.

From the thorough manner in which the propeller now in course of

erection is being built, I am led to believe that a steamer of the largest dimensions necessary for inter-island trade could be built here, and I know the machinery requisite could be obtained at a very low rate in California. Hawaii produces just the timber requisite, which could be easily obtained, and the expenditure of the money necessary for the purpose could be disbursed among our own people, and a portion find its way back to the treasury again.

Submitting these brief and by no means thorough remarks,

I have the honor to be, sir,

Your most ob't serv't,

HENRY PRENDERGAST.

DISCOURSE ON ROADS.

Read to the R. H. Agricultural Society, July 31.

In many parts of the Islands, the agriculturist will labor in vain, unless he have good roads to convey his produce to market. But so it has been with all countries in the world, even long after they had attained a degree of civilization and wealth, higher than any we can as yet pretend to. In no country where the population is sparse can good roads be expected, because there are neither laborers to make them, nor money to make them and keep them in repair. With less than 80 000 inhabitants spread over 6100 square miles of territory, all that we can expect is to have good roads in the immediate vicinity of towns and seaports, and even to make them, our revenue does not as yet suffice.

In an essay by Mr. Metcalf, which will be found in Report No. 4, for 1853, he states there are scarcely ten consecutive miles of sea-coast, where there is not anchorage and where a landing cannot be effected, almost every day. If this be the case, and no doubt of the fact is implied, it must be evident that if a good cart road close to the sea shore could be carried around all the principal islands, it would be of great public advantage. Wherever from the centre of the islands, valleys and rivulets radiate towards the coast, there must be a facility in making a practicable road down towards the coast; and

the inhabitants of each valley would find it their interest to make such a road, if they were sure that in carrying it to the sea-side it would strike a circular road, by which their produce could be easily and cheaply conveyed to a place of shipment.

The natives have yet to learn how much they are able to achieve by *combining their labor*. If the inhabitants of each valley throughout the islands, were to assist each other, for their common good, in a very short period they might have local roads, grounds fenced in, water courses dug and embanked, new and roomy houses built and thatched, and even churches and school-houses erected. Spending, as they unfortunately do, the greatest portion of every year in slothful inaction, the *time* required for such co-operation would really cost them nothing; they would sacrifice no earnings of daily labor to which they do not apply themselves; and each family would be amply repaid for its labor for others, by its own participation in the common benefit. For example; if a family had to assist its neighbors in fencing their lands and building their houses, those neighbors would assist that family in turn, to fence the lands belonging to and build a house for such family. Roads, water courses, churches and schools are all for the common benefit of those who live so near as to be able to use them, and no man can labor at such works without benefiting himself. The Hawaiian people will never prosper, until they depend more upon themselves and less upon the government than they have been accustomed to do. They seem to think that the government should do everything for them, while they do nothing for themselves. They have yet to learn that the source of all wealth is labor; that without labor neither taxes nor duties could be paid, the government would derive no revenue, and having no revenue, it could not even exist, and far less make roads, improve harbors, or undertake any other work for the good of the people. All that the best government can do, is to encourage labor by removing every obstruction to industry, to maintain peace and order, to protect life and property, and to administer justice, cheaply, promptly, and impartially, to every man.

It is no reproach to the Hawaiian people to say that they are bad road makers; neither road-making nor shoe-making come by inspiration. As practical arts they must be taught and learned *practically*.

Yet, hitherto in all our attempts at street and road-making, we have trusted chiefly to native labor and native direction. The first is a necessity, but the second is not. The power given to the Minister of the Interior to appoint Road Supervisors throughout the Kingdom, by the 4th Section of the Act relating to the Road Tax, approved by the King on the 30th of June last, and published in the Polynesian No. 11, of the 19th instant, will enable that Minister to correct a great evil by appointing only road supervisors who know something of the way in which roads should be constructed.

Now in what way ought roads to be constructed? It may be answered—by observing in what manner our main road leading up Nuuanu valley has been made and repaired, and by adopting as a principle of road-making the very reverse of what has been done on the Nuuanu road.

The plan that seems to have been pursued here appears to have been, to mark out the line of road, dig a trench on each side and throw the loose earth on the road towards the centre; and the plan pursued to repair it, is to throw the earth on the sides, washed and trampled down from the centre, back again upon or towards the centre (capping the climax of absurdity by a thin topping of black sand)—thus preparing the way for the same process to be repeated twice or thrice a year to the end of time.

Let us hear what Mr. Webster, who is a civil engineer, says of road making. On the 22d of February last, he wrote as follows:

“ I may say shortly that a good road should be laid off as direct as possible between the points desired to be connected; that it should avoid hills where they can be avoided, also the bottom of hollows, where it is liable to become a mere water course; that it should have at least a foot of gravel at the top, laid on a curve to throw off the water; and last that it should be thoroughly drained by means of side ditches to be kept always clear and in good order, care being taken to give vent to the water from the ditches as often as practicable. The surface of the road when once formed ought to receive constant attention, and if from subsidence the water is found to lodge on any part, it should immediately be let off and fresh gravel applied to fill the hollow.”

The Nuuanu road has been constructed and is yearly repaired upon principles the very reverse of these plain, common sense rules recommended by Mr. Webster; and, without any excuse whatever, for the adjacent stone quarry of Mr. Booth, rendered it easy to procure any quantity of gravel.

- It is but too probable that the 150 miles of carriage road and 450 miles of bridle road reported as made, by Mr. Metcalf (see page 148 of Report No. 4, for 1853) were roads constructed on the same principles as our famous high-way of Nuuanu. Any other inference is scarcely compatible with what Mr. Webster states at page 151 of the same No., which was that the then existing roads on Oahu, were "as bad as nature assisted by art could make them"—and as for bridges, that any one crossing them on horseback, had reason to be thankful that he had got to the other side with whole bones and without a ducking.

From the language used by Mr. Webster it is quite clear that in his view, art had only rendered our roads, naturally bad, still worse; if so, whatever money may have been expended on the 600 miles of road alluded to by Mr. Metcalf, must have been thrown away; and it will be wisdom now not to expend a single dollar on roads, unless under the new law above referred to, the Minister of the Interior have some security that the road will be constructed according to the principles recommended by Mr. Webster.

These principles agree with those adopted by the Romans upwards of 20 centuries ago.

The Babylonians, the Persians, the Egyptians and the Greeks, although the most civilized nations of antiquity, were wanting in a system of public roads. Not so the Carthaginians, the Etruscans, and the Romans, but especially the latter, during the earlier period of the empire. From the various gates of ancient Rome, diverged about thirty principal roads, towards the furthest limits of the empire, each with many collateral roads branching out in various directions. Of several of the principal of those roads, remains exist to this day, after a lapse of more than 2000 years.

We may profitably enquire what was the Roman system of road making that was so extraordinarily durable. Statius thus describes it:

“The road was lined out as straight as possible, and the width marked by a trench at each side. The next step was to remove the whole of the soil betwixt the trenches to the full depth of the road. If the ground at the bottom was found to be firm and solid, the surface of it was levelled and the work proceeded; but if not, then piles were driven to secure it. Thus a place was formed to receive the mass of materials which formed the body of the road; this was termed the *gremium*, and the whole purpose of it was to prepare a suitable and durable bed for the upper surface—the *pavimentum*, or roadway. The *gremium* consisted of three distinct parts, the lowest being the *statumen*, the middle the *rudus*, and the uppermost the *nucleus*. The *statumen* varied in depth according to circumstances. It was laid upon the surface of the bed of the road, whether that surface was the natural soil or the tops of the piles, and was composed of rough, hard stones, of a size to fill the hand. It was laid on, ordinarily to the depth of from 12 to 18 inches. On such depth of *statumen*, was placed the *rudus*, which was a mass of small broken stones cemented with lime mortar, of about nine inches thick, thoroughly beat together and smoothed. For that purpose, parties of ten men, with heavy wooden mallets were employed. The lime mortar was to be in proportion of one third, if the materials were new, and of two-fifths, if they were old.

“Over the *rudus*, was laid the *nucleus*, which was a layer, six inches deep, of broken bricks, tiles and pottery mixed up with a third part of lime mortar.

“These three layers only formed the bed for the roadway.

“The roadway itself, in the best roads, was formed of blocks of basalt, carefully laid by rule and level. These blocks were of various sizes, but usually from 9 to 12 inches deep—the sides cut into polygons, so closely fitted together, as to give the road the appearance of being of one stone.

“On each side of the road when complete, was a foot-path raised above its level, sometimes paved like the road, and at other times, only covered with gravel, but always bordered with stones carefully placed in the margin.

“In order that the water might flow off from the road, its centre was raised higher than the sides.

“The two great principles of the Roman road making were a solid foundation and a perfect dryness; and both of them were obtained by the rules prescribed in the most effectual manner.”

Such an expensive system of road making is wholly inapplicable to the Hawaiian Islands, where the want of money is the great obstacle to the making of roads and of all other improvements. But it is not so with the *principles* followed by the Romans. We can apply our labor, so as to make a convexity in our roads, and to preserve that convexity, and not so as to tend to that concavity of which the Nuuanu road presents a near example, rendering it even, after rains, a mere channel for water and mud. If after the road has been hardened by the sun and by traffic, the ruts and hollows were filled up by gravel and the earth on the sides thrown off the road, in place of upon the road, and the ditches on each side always kept clear and deep enough, the heaviest rain would not convert it into a puddle; the road would be efficient for carriage and foot passengers in all weathers, and it would be kept in repair at less annual expense than at present.

The writer does not pretend to be more than a theorist in road making, yet in April, 1848, he made a road of 131 fathoms, at a cost of \$327 50 cts., upon the same principles as those recommended by Mr. Webster, and practiced by the Romans, which has stood all weathers ever since, without ever losing its convexity, without ever lodging water, or requiring one dollar of expenditure for repairs. The only variation from Mr. Webster's plan, was in the substitution of black sand, to the depth of about 18 inches, in place of gravel.

The opinion of Mr. R. A. S. Wood, Superintendent of Public Works, does not differ materially from that of Mr. Webster. On the 6th of March last, he gave the following as his views:

“The condition of most of the roads does not indicate any material improvement for the past four or five years. And while it could not be expected that those to whom is intrusted the construction and repairs of the highways of internal commerce should be practical engineers, it is deplorable that what little they do attempt should be generally in the wrong direction. Situated as we are in a climate free from frost and so favorable to good roads, I doubt very much if

thirty miles of road can be found in the whole kingdom, where a single pair of oxen could haul 40 bushels of wheat, or any equal weight of any kind that the farmer wishes to get to market. The grand difficulty appears to be the want of a proper knowledge of draining, and the most suitable material to fill up marshy and other wet places. We have abundance of materials for such purposes, but our *Lunas* prefer taking another method, and treat the roads that require to be firm and hard in the same manner as they would their farms, viz: by applying the plough, and breaking up a mass of soft matter that is washed away by the first rains, or else remains a dusty nuisance through the dry season. I think a moderate appropriation could not be in any way better applied to the public good, than to employ a competent practical person, one acquainted with the wants and resources of the people, to make a tour of the entire group, and impart such instruction as will secure in future a more profitable expenditure of the road tax, for it is well founded from long experience that under the present system of road making it is a waste of money and a blot upon the government."

It is to be hoped that the Minister of the Interior, under the powers conferred upon him by the late Act already referred to, will remove that "blot" from the government, and relieve the King's scanty treasury from paying such artists in road making as heretofore have only by their art, "assisted nature" in rendering our roads *as bad as bad can be*, without leaving us thirty continuous miles along which 40 bushels of wheat can be hauled.

It is evident that our *Lunas* have been hitherto playing the game of *Sisyphus*, with this only difference, that while he strives to roll up a stone ever coming down again, our *Lunas* strive to roll up earth, which the rain ever washes down again in the form of mud.

There is not one dollar in the Treasury to spare for such absurd amusement.

R. C. WYLLIE.

FOREIGN OFFICE, July 23d, 1856.

REPORT ON CATTLE AND SHEEP.

Having been called upon to write a report on cattle and one on

sheep for the year ending July, 1856, as chairman of the committees on both these subjects, I have taken the liberty of making one report include both. It is hardly fair to call on any one individual to report on the same subject year after year, besides that such a course fails to elicit the different views and experiences of different individuals, and as I have already written at least three reports on cattle and I think two on sheep, I can hardly be expected to have anything fresh to say on the subject.

As many persons suppose that the cultivation of the soil is in all cases the most important pursuit in which those who live in the country and whose business it is to produce food for the human race can be engaged, and consider grazing of very secondary importance, I must be allowed to make a quotation from the works of Dr. Pickering, of the U. S. Exploring Expedition, in support of my opinion that the relative value to the community of the two branches of farming depend entirely on circumstances. In his work on the Races of Men, he gives a map of the world exhibiting his views of the geographical distribution of the different races. From his explanation of his map I quote the following:

“The phases of climate, varying especially in the proportions of moisture, partition out the soil and its vegetable growth into three well marked divisions. 1. There are countries which are almost entirely devoid of vegetation. 2. Other extensive regions are more or less covered with herbage or produce scattered bushes and stunted woody plants, but are destitute of proper forests. 3. A third description of territory is in its natural state clothed with continuous woods. This state of things is likewise presented on the map not merely from its connexion with geographical botany, but as a point eminently illustrative of the history and present condition of the human family.

“Art indeed cuts down the forest and encroaches slightly on the barren territory; but yet the above three natural divisions will very nearly correspond with desert, pastoral and agricultural countries. It is a mistake to suppose with many that pastoral or nomadic life is a stage in the progressive improvement of society. The condition is inscribed on the face of nature, and widely extended regions minister to the wants of man where nevertheless cultivation is impossible.”

So far Dr. Pickering. Now it seems to me that the proportion which the arable land in the Sandwich Islands bears to that which is well adapted for grazing purposes is very small indeed. The Islands undoubtedly in former days supported a population many times more numerous than its present one, almost exclusively on vegetable diet. But what was it? The cereals were unknown here, and the kalo and sweet potato are both so perishable when ripe that they must be used almost immediately after being taken out of the earth or ponds where they were grown. Now a much smaller population cannot depend on the produce of any one country to minister to its daily wants, and therefore we must produce something here which we can exchange for the productions of other countries.

I think I may say that there are hundreds of acres here fitted for the production of wool, beef, hides, and tallow, for the one acre fitted for the production of sugar, coffee, or tobacco. And while I admit the excellent quality of these articles produced here, I claim the same meed of praise for the articles produced by the grazier. Wool must become an important article of export from these Islands, because exports we must have, and you can judge from the wool grown and exhibited at your Fair, whether such an article can fail to take its proper place in a market where the demand is increasing every year. As for beef, it is only in the lazy climate of tropical islands in the Pacific, (I don't allude to any one island in particular) that casks of salt beef which had come round the Horn and crossed the Line twice, could be offered for sale year after year in the harbor of a group which contains many thousands of fat cattle ranging over accessible pastures. The graziers are however, gradually though slowly awakening from their long lethargy, and in addition to the Angushire, Hereford, Durham, and Devon cattle imported here previously, there are now on their way here two pure short horns from the States.

In the sheep line, a pure Merino ram and ewe of the best description have been imported from Australia by John Montgomery, Esq., since our last meeting, and there are exhibited at the present Fair a South Down ram and ewe of those imported by Thomas Cummins, Esq. These in addition to the Merinos imported previously at different times from Van Dieman's Land, Australia, and the States,

will give with a little care and judicious crossing, as good mutton and wool as can be grown anywhere. The same may be said of the cattle. With care and attention, judicious breeding and our good pastures, we need not fear competition from any other country.

That beef can be perfectly cured here is certain, because it has been done, and what has been done may be done again, but every trace of the old fashioned, filthy, slovenly, Spanish system must be abolished before any one can hope to succeed in packing beef. Bull-fights are gone out of fashion every where, and it must be remembered that the animal which has been worried and excited immediately before its decease, has its certain revenge by refusing in consequence to keep sweet. In order that the animal may die calmly, it must live peaceably, and must have been brought up in a state of civilization.

I have but one word more to say with regard to increase. Every good gardener knows that the quantity and quality of his crop of fruit depends quite as much on a free use of the pruning knife, as on the cultivation and fertility of his soil. And so it is with cattle on the extensive pastures where we are compelled to run them here, without the means of separating the different ages and sexes. A very little reflection will show that if a heifer has a calf at eighteen months old, and is allowed to rear it, that she and her calf will not be worth so much together in twelve months time as a large well-grown two and a half years old heifer, either fat or about to calve again. In the same way it is unprofitable to allow the old cows to rear calves until their death from exhaustion. There is an old saying that the half is sometimes more than the whole, which I think applies to this case.

R. MOFFITT.

ON SOILS.

By HON. L. ANDREWS.

By *soil*, in agriculture, is meant that compound substance which constitutes the upper surface of the earth. It is that which furnishes nutriment and support to trees and plants. Soil is a compound of particles of very different, and often of opposite natures.

Johnson, in his "Chemistry of Common Life," describes the formation of soil as follows: "The soil is formed for the most part from the rocks of which the crust of the earth is composed. By the action of air and water these rocks crumble, and their surface becomes covered with loose materials. The seeds of plants are sprinkled over them by the winds; they germinate and grow up; animals come to feed upon them; both plants and animals die; and thus a mixture of decayed rock, with the remains of animals and plants, gradually overspread the entire surface of the dry land. It is to this mixture we apply the name *soil*."

"But the soil thus naturally formed," continues the author, "differs in quality, from various causes. The rocks which crumble differ in their chemical composition; their crumbled fragments are spread over the surface, and sorted by wind and water in different ways; and the kind and quantity of the animal and vegetable matters they are mixed with, differ much. Through the agency of these and similar causes of diversity, many varieties of soil are produced, which are not only unlike to each other in their sensible properties, but very different also in their agricultural value." [Vol. 1, p. 42.]

Chemically speaking, the substance or constituent parts of a soil, as ascertained by analysis, are as follows:

1. Silica, or finely pulverised flint stones.
2. Alumina, or pure clay.
3. Lime, that is, the chalk of bones, shells and a certain kind of stones.
4. Magnesia, or a soft, white, flour-like powder.
5. Oxyd of iron, or iron rust.
6. Salts, that is, various substances composed of some acid united with a metallic oxyd or alkaloid.
7. Remains of animals and vegetables.

Here, as before, from chemical analysis, it is easy to see that the substances above mentioned may be united in very different proportions, one or more failing altogether, and hence very different soils produced from the same substances.

For example, where silica, or pulverized flint stones, or sand predominates or exceeds a due proportion in a soil, such soil will not

answer the general purposes of agriculture, as it will produce only such vegetables as require an unusual supply of silica. Again, if a soil abounds in alumina or clay, it will be fit only for those plants or grasses which demand a large quantity of clay for their growth and support. And so of others.

For practical purposes, soils may be known and named after the names of their predominating compound, viz:

1. A silicious or sandy soil is one where sand or gravel greatly abounds. This soil is light, friable, readily absorbing moisture, and as readily yielding it up to drying winds or the heat of the sun. The surface of such soils is easily moveable by winds or floods of water.

2. Aluminous or clayey soils are heavy, adhesive, cold, and when dry, very hard. They are valuable when mixed with silicious or limey soils, as alumina tends to give body and tenacity to the lighter soils.

3. A limey soil is one where limestone or sea shells greatly abound. It is often rich for certain vegetables.

4. A due mixture of the above materials with a due proportion of animal and vegetable matter constitutes what is termed loam, a black or dark colored, soft, mellow earth. If decayed vegetable substances greatly predominate, it is called vegetable mould.

It should be understood that whatever materials may enter into the formation of a soil, a proportion of water or moisture is essential to the growth of any vegetable.

"The beau ideal," therefore, "of a fertile soil, is one which contains such a portion of decomposing matter and of moisture as to keep the crop growing upon it always supplied with food in a state fit for introsusception, yet not so superabundantly as to render the plants too luxuriant." [Dic. of Gardening.] It is in the due proportion, therefore, of the foregoing analyzed materials, that a soil suitable for gardening or agricultural purposes may be produced.

Thus far our remarks will apply to soils in general all over the world. But it is of great importance to the agricultural interests of these islands that more definite, specific information should be disseminated among cultivators respecting the soils they cultivate. But here, the writer dares not hope that he can give any information.

There are obviously a great variety of soils on the Hawaiian group, but to understand their nature either chemically or for the purpose of practical agriculture, will require careful investigation and repeated experiments; for nothing is more common than to see vegetation growing luxuriantly in one location, and almost entirely refusing to grow in another not far distant.

As for the first ingredient mentioned in the formation of a soil, viz: silica or sand, that is, pulverized flint stones, there is probably very little if any on the islands. What is called sand on our sea shores is mostly made up of broken coral, shells and lava. Mr. Richards once caused a quantity of sea sand to be melted. The result was a large cake of black friable lava; showing that the lava preponderated.

A few things only can be submitted relative to the soils of these islands. It will not be disputed that the islands were originally of volcanic origin; that either when thrown up into their present form, or previously, they were in a fluid or semi-fluid state. In this condition once were all these mountains, hills, ravines, depressions and plains. They must then have been destitute of every vegetable, from the fact that there could have been no soil for their production or support. All was rock, lava, scoria and slag. But the winds, rain, and heat of the sun, would make an impression. The surface of the rocks would soften, and some parts would fall off; the lava, still softer, would begin to disintegrate; the scoria and slag would crumble, fall into masses—would oxydize; and acted upon by winds and rain, the crevices of rocks would fill up, a smoother appearance would follow, seeds of vegetables and trees would be brought—would grow, die, fall down and decay. From time to time quantities of decaying matter from the mountains and hills would be deposited in the ravines and vallies and on the plains. This mixed with decayed animal and vegetable matter, would form a soil below. Now, from the tops of the mountains to the shore there would be soils of different kinds, according to the various operations of nature in different locations and under different circumstances, and these soils would be adapted to different products according to their different compositions. If we go to the top of Haleakala, on Maui, we shall find it nearly destitute of vegetation; because, as fast as the winds and rain decompose the

rocks, the lava and the volcanic sand, the winds drive and the rains wash all the movable particles down the mountain till some obstruction prevents them, or till they reach the plain. As we descend lower, where decomposition has been going on aided by what was received from above, we find different kinds of vegetation, and so on till we arrive in a dense forest, where a rich loamy soil may be found, a soil adapted to potatoes, corn, wheat, and other vegetables.

If, on the other hand, we descend on the windward side, the wind, indeed, drives nothing downward, but with the rain it helps dissolve all the soft parts of rocks and lavas, helps decompose vegetables till, without a very deep soil, a dense forest of heavy timber is found, and perennial greenness is seen even to the sea beach.

Such, in few words, may be the theory of soil-making on these islands. It appears that most of the soils where cultivation has been attempted are located either on or near the sea beach, say from ten to seventy feet above the level of the sea, on the leeward sides of the islands. Then passing over a belt, little has been attempted till we gain the height of 1,500 to 2,500; this is the region of sugar cane, wheat and Irish potatoes. The soil near the beach on the leeward sides of the Islands may be denominated an alluvial or a washed soil, having been brought from the mountains by winds and rains and mixed with the sand of the shore, which, as before, is composed of broken lava, coral and shells, together with the decayed vegetable and animal matters. This soil is generally rich, dry and warm, and needs artificial irrigation.

On the windward side of the Islands, where the rain has been the more efficient agent, the soil is perhaps not so deep; but from more decayed vegetable matter is more moist and more productive, and cultivation may be extended from the shore to any convenient height.

High up the mountains the subsoil appears to consist of half decomposed lava, containing large quantities of the red oxyd of iron. Some locations, however, contain more or less alumina or clay.

The ravines also have varieties of soil, as they have different deposits from above, but all productive.

It is difficult to say exactly how long the process of decomposition of lava must be before vegetation can be sustained; but it appears

that ferns, grass, and even trees will grow before there is any visible appearance of a soil. In 1828 the writer passed over a tract in Koolau, on the northern side of East Maui, which to all appearance had lately flown down from Haleakala. The lava was crumbled fine, that is, from the size of a man's fist downward, black, shining, hard, and not a particle of earthy matter could be seen; yet from this mass was growing very luxuriantly ferns, grasses, bushes, then becoming small trees from ten to twenty-five feet in height. How many years this mass had been acted upon by strong winds and heavy rains it is difficult to say. The lava was scarcely changed in color or form, and to all appearance the vegetables then growing were the first growth. The writer has been informed that the place is now covered (28 years) with a dense young forest. On the south side of the same mountain, in Kahikinui, there seems to have been a flood of lava, at some age long ago, which is nearly bare of vegetation, and the only change apparent on the lava is a slight decay, or the oxydization from the atmosphere. This region has but little rain and the winds are very oblique.

Again, in 1830, the writer noticed, in traveling from Hilo to the volcano of Kilauea, after passing the forests several miles that tracts of lava, a species called by Hawaiians *pahoehoe*—smooth, flat, and when fresh, shining—were lying from one to five acres together, where not a weed, bush, or tuft of grass could be seen. In 1850, passing over the same region, he noticed that these same tracts were nearly covered with a growth of young ferns, grass and bushes, averaging from two to four feet in height. This region is acted upon by the trade winds and rains, and this growth has been produced in the space of twenty years.

There are several things that tend to modify the character of soils whatever the composition may be.

Vegetation itself has an influence. If a tree fall to the earth, it will eventually decay and its particles will be mixed with the existing soil, and will so far change the properties of that soil. So of grasses, weeds, bushes, especially when they grow in abundance, and the operation of growing, dying and decaying has long been continued. If such locations are found at the foot of mountains, or on the banks

of streams, the soils there are called alluvial soils, or in common language, loam. Of such is the soil of Lahaina, Maui, and Holokahua, east of Honolulu. They are generally rich so far as the composition of the soil is concerned, and capable of producing a great variety of vegetables. Vegetation, therefore, has the reciprocal action of cause and effect.

Rain also modifies the soil, not only by furnishing moisture for the plants, but its effect upon the different constituent particles of soil. The chemical properties of rain act differently upon the soil from water poured on. Add to this the frequent washing of the leaves of vegetables, and it will soon appear that two pieces of land of the same soils, one watered altogether by irrigation and the other by showers, will soon have their soils unlike.

The trade winds in some locations have a modifying effect on soils, besides their connection with rain. Where they are so strong as to move sands, the sands are more or less moved by them and thrown into banks or hillocks, and are so fluctuating that but little vegetation grows, as between East and West Maui, and on the eastern side of Kamaalea Bay. Winds also effect plants and even trees, especially fruit trees, by whipping their leaves and curvating their trunks, and preventing the ordinary operations of nature and thwarting what would otherwise be the regular productions of the soil.

Manures change the character of a soil: but this introduces another subject which does not belong here.

Cultivation itself has an influence upon soils, especially that of barrenness and fertility. Properly cultivated, soils become more and more productive; badly managed, they soon wear out.

A grand desideratum on these Islands is the skillful regulation of wet and dry, so as to constitute the great mass of soils available. The superabundant moisture, however, is more manageable than its opposite. Few locations are such that they cannot be easily drained if there is naturally too much water; but for dry soils there is more difficulty. Thousands and thousands of acres are found on the Islands partly or wholly barren for want of sufficient moisture; and even many of the tracts subjected to cultivation are deficient, for nothing is more common than for crops to suffer from drought. The

partial remedies are two: one is mixing aluminous or clayey earths with the sandy or alluvial soils. The clays are retentive of moisture and will absorb it from the atmosphere, and hence will bear a greater degree of drought. The other is deep cultivation. Modern experiments have demonstrated that for deep soils deep digging or plowing is a pretty sure remedy for drought. The soil in such cases receives and retains more moisture than it otherwise would, and imparts it in time of need.* This remedy applies to alluvial or semi-alluvial soils. All kinds of earth, however, will not bear deep digging. If the digging or plowing brings up the hard red earth containing considerable red oxyd of iron, such earth will be unproductive until it has lain a year or two exposed to the winds and rains of the atmosphere. Last February the writer had a portion of his garden dug up and pulverized, to the depth of from twenty-two to twenty-eight inches. On one part he noticed that the lowest twelve inches or more was a thick, heavy, reddish earth, and this, without reflection, was left on the surface. Some squashes were planted, which after a long time came up and slowly grew to the third or fourth leaf, and then died. Beans afterwards, with manure, produced about half a crop.

The writer will now close his remarks by several suggestions:

1. The Society needs more information relative to the nature of soils, such as could be imparted by an agricultural chemist.

2. Time and patience must be expended after all that chemistry and the analysis of soils can do. For example, the books say that silica and alumina, that is, powdered flint stones and clay, are essential to good soils, and yet we have very good soils on these Islands apparently without a particle of either, unless indeed they are found in our lavas.

3. Every farmer and gardener should not only try experiments, but should keep a book noting his experiments, with dates, kinds of soil, method of cultivation, with the results, with all the accuracy of a practical book-keeper.

4. One or the other, or both, of our newspapers should devote a short or long article, as the case may be, each week to agricultural subjects, theory and practice. They should be written in plain language, easily comprehended by common readers.

5. Let industry, patience and perseverance supply the place of a great outlay of cash at the commencement of our efforts. Cultivate no more than can be cultivated thoroughly, that the experiments may fairly be made. It seems from late efforts that no bounds can be set to the fertility of the soil when properly tilled; and the ratio of expense diminishes with the ratio of the products.

REPORT ON FLORICULTURE.

HONOLULU, July 29, 1856.

Mr. President, and Gentlemen of the R. H. Agricultural Society:

I have to regret particularly in this usually leisure season with the business men of our community, that a multiplicity of business matters have so pressed upon my time within the last few days as entirely to preclude the possibility of my performing the duty assigned me of preparing a report for your Society upon the subject of Floriculture.

An abler pen than mine when once enlisted, would most undoubtedly furnish from a theme so prolific, even in the few moments I now devote to it, an exceedingly interesting and flowery report; but as you are aware, I am much more accustomed to deal with facts, than flowery figures of rhetoric. I shall therefore simply "report progress, and ask for further time."

That we have made steady, and somewhat rapid progress in Floriculture as a society, not only during the last year, but from year to year since the organization of this association, no resident of Honolulu during the last six years, will deny. And I think I may safely report, that during the last year, more progress has been made in Floriculture than any other branch of culture recognized and encouraged by your Society, and had our fair taken place six or eight weeks earlier, my assertion would have been backed up by a display of flowers, perhaps scarcely inferior to that of similar exhibitions in the oldest and most refined cities of Europe and America. As it is, lacking the aid of the *forests*—the importance of which has been so

ably demonstrated to you this evening—in bringing, condensing and returning the moisture so essential to the growth and development of the vegetable kingdom, especially flowers, in the light, arid soil of Honolulu; and also in the absence of either forests, fences, or aught else “to keep the strong trades from the Pali fifty feet over our heads,” or even one foot above the heads of our flowers,—I can but fear a poor display to-morrow, and shall not be surprised if some of our friends are led to believe we have taken a retrograde step since fifty-five, should they allow themselves to judge of our progress from the exhibition.

Such however is not the fact. Not only has the display at our annual fairs increased in quantity, but the daily, and I might almost say uninterrupted display from January to December in the front yards and gardens of our citizens, bears incontrovertible testimony to the fact, that no pains or expense, within command of those interested in this delightful occupation, has been spared to introduce the most choice and valued varieties of plants, flowers, and shrubs, from every quarter of the globe accessible.

Several varieties of the rose—the queen of flowers—have been introduced during the last year. The sweet-scented honeysuckle, has for the first time blossomed in our yards. The white and the red pond lily, are also here, and we hope soon to gratify you with its rich perfume.

A variety of seeds, and some plants of choice kinds have lately been introduced from Tahiti and Valparaiso. An important fact to be borne in mind by your Society in connexion with this subject is, that all is done by individual enterprise and spirit, without cost or trouble to the Society, and is besides a source of revenue to its treasury.

Respectfully submitted,

J. H. WOOD,

REPORT ON MANUFACTURES.

POKII, July 19, 1856.

DEAR SIR:—As it is out of my power, to be present at the next

meeting of the Agricultural Society, it will fall to you, in my absence, to present the report on Manufactures.

It was only on the 17th instant that I was informed by a circular, that Mr. R. A. S. Wood had declined acting as chairman of the committee on manufactures, and that I was expected to report in his stead. I had before remarked that I was one of the committee, and had written some remarks that I intended to forward to the chairman, for him to embody in his report if he saw fit, and as the short time that has yet to pass before the meeting of the Society puts it out of my power to procure any farther information on the subject, I am sorry to say that my report must be a very meagre one.

With respect to native manufactures, I can report that they are not on the increase on this island. Although I have given myself some trouble on the subject, and promised a good price for the articles, I have not been able to procure a hat or a fine mat for the exhibition. On this part of the island, where the grass for these articles can be procured in any quantity, there could no doubt be a good deal of money made by their manufacture, if the women and girls would only work at them, but I much fear that years will pass before such a revolution takes place in their habits as to induce them to work, unless driven to it by necessity. From one woman, who last year received five dollars premium for her hats exhibited by the Society, I have not been able to procure enough to supply the orders of a few gentlemen in Honolulu.

During the last few months, Mr. J. R. Opitz has begun the manufacture of cigars at Koloa, which, should it succeed, will prove a great benefit by supplying with a home manufacture what is at present an expensive article of import.

The most important addition to our manufacturing industry has been made by H. A. Widemann, Esq., of Nawiliwili, by starting or reviving the manufacture of kukui oil. A good many years ago, the pressing of oil from kukui nuts was carried on at Koloa by Mr. Goodale, who as far as I can learn tried to introduce it as a substitute for paint oil. How far he succeeded I cannot say, but as what he made was inferior to linseed oil, I suppose he did not meet with a ready sale. Mr. Widemann, who intends his for burning, has taken a dif-

ferent method in its manufacture, and in my opinion makes an oil that is second only to the best sperm. This opinion I give after using it for some time in my own house. As the nuts used were formerly allowed to rot on the ground, we may look upon every gallon of kukui nut oil made, as so much directly added to the wealth of the islands, and it is to be hoped that people will buy this home made article rather than imported oils. When Mr. Widemann has got his presses, &c., in good order, he expects to make about 170 galls. per week, and as the picking, grinding and pressing of the nuts is rather expensive, only a ready sale can remunerate him for his outlay. I have lately seen some painting done with kukui oil, which leads me to suppose that with care in its manufacture it will answer the purpose as well as linseed oil.

In the hope that you will be able to add to this, so as to make it of sufficient value to present to the Society, I remain,

Your obedient servant, A. ARCHER.

REPORT ON WORMS.

WAIAWA, July 18th, 1856.

Dr. Wm. Hillebrand:

DEAR SIR:—As I shall not be present at the Agricultural Exhibition to be held at Honolulu on the 30th of this month, it will devolve upon some other member of the “Committee on Cutworms and other injurious vermin” to make a report at the meeting. You are the only member of said committee that I know will be present, and I therefore take the liberty of addressing you on the subject, leaving it, of course, altogether to your better judgment how to act farther in the case. When it came to my knowledge that I was put on a committee on cutworms, etc., and was expected to make a report thereon, my first impression was to beg myself excused on account of my short stay on the Islands and ignorance on the subject, but taking an interest in the efforts of the Society, and considering that any suggestions, or small special information, added to the stock of knowledge on hand, might be of some value, I resolved to put down what little I

know of the worms on these Islands, and what I think might lead to diminish them.

The valuable reports made to the Society by Dr. Newcomb in 1852, and by Mr. J. W. Marsh in 1855, have left nothing to write on the subject in general, and I shall therefore restrict myself chiefly to the cutworms and their ravages in this district of Waimea, Kauai.

I have often in vain tried to get some information on the worms from natives, but all their experience seems to be, that it is of no use to fight against the cutworms when they come thick, as only happens once in several years, and that always in very rainy ones. In the spring of 1855 the rains fell unusually heavy, and the most part of the lands here were for a few days overflowed. Shortly afterwards the cutworms appeared in masses, and when the foreign planters tried to get rid of them, the natives without any exception advised not to kill the worms, as they certainly would revenge themselves.

The quantity of worms was astonishing, and when a number of buckets full were picked off, the next morning would find them on the same field almost as thick as before. Upwards of 100 cutworms by one plant was not at all rare, and generally they were found lying together of all ages and sizes, from the largest $2\frac{1}{2}$ inches long and $\frac{1}{4}$ inch in diameter, to the small, newly bred one-quarter inch long, as thick as a pin.

This kind of family life seemingly led to the idea that the smaller ones were bred from the large worms; and I have heard that it is believed by several foreigners, that these cutworms in their propagation do not go through the changes of other insects. In order to satisfy myself, I put several large cutworms in tumblers half full with sand, and fed them till they changed into chrysalis, from which afterwards came a very pretty moth $1\frac{1}{4}$ inch long, black body, gray wings and a short, thick head. It kept quiet through the day, but got very active towards sunset—in that respect like its descendants, the cutworms, which prefer foraging at night. Though always on the look-out for all kinds of moths, I never happened to find but one of these moths besides what I bred myself.

Of the cutworm, which the natives here call *kupa*, I have found five varieties:

1st. Brown, with a white stripe on the back and white belly. It grows to the largest size, fully $2\frac{1}{2}$ inches long and one-quarter inch thick. It is very voracious, and a single worm will strip a large plant, leaving nothing but the ribs.

2nd. Gray, with a brown back of a bright shining appearance; it does not grow quite as large as No. 1. It is the regular cutworm that seems to enjoy nothing but the juice of the stems, which it will often cut off when quite large and hard.

3d. Is as destructive as the former, and also like it in color and size, only not bright or shining on its back.

4th. Is bluish-gray, with head and tail white—rather rare.

5th. Mudcolored; is the one that appears every year, and seems able to do with less wet soil. It is not quite as voracious, nor does it attain the size of the former ones, but still is very destructive.

There may be, and no doubt are, more varieties in shades of color, but the five above named seem quite distinct.

To find out some way of exterminating these troublesome visitors, would be as great a benefit as could be conferred on farmers on these Islands; but I am afraid it will take a long time before man shall get so far into the secrets of Nature's working. The locust and grasshopper, the army worm, and other vermin, have since time immemorial been known in different parts of the globe to ravage large tracts of cultivated land, and still mankind is at the present day as ignorant how to destroy them as thousands of years ago.

If the whole area of the Islands were or could be cultivated, it might be possible to exterminate the whole tribe of worms; but the thousands of acres of kula land and mountain sides, where the plow never reaches, afford the different vermin a safe breeding place. It has been recommended to farmers to burn off the grass of surrounding waste lands, but I very much doubt whether this does any material harm to the chrysalis, which generally is buried an inch or two in the ground. The use of coal-tar, soap suds, and such like, may be of some use in a small garden, but would be out of the question on a field.

The only hope of effectually checking the ravages of such an enemy, whose ways and means are hidden to us, seems therefore to

be, as recommended by every writer on the subject, to counteract the worms by protecting their natural enemies. First in the rank of these stands the native plover, *kolea*, who, at some seasons, chiefly feed on the different chrysalis; and it ought to be forbidden by law to do any kind of harm to these birds. The dragon-fly also wages an incessant and successful war against all mothers of vermin. Lizards, spiders, and the indigenous small ant no doubt help to destroy a large quantity of worms; but still all our native forces have proved insufficient, and we have to look round to find more assistance. Several birds have previously been recommended as destroyers of vermin, but however pleasant their presence would be, I fear the importation of most of the kinds named would be difficult and expensive, and most likely the birds when here would hie away to the mountains, and therefore be of less assistance to the farmer. The quail may be would make an exception, as this fine bird seems to love the neighborhood of the farm. It is not difficult to procure nor to support under transportation, and it increases rapidly. A distribution of this bird by the Society over the different islands, would have beneficial results if the birds were let alone. Another great enemy of all larvæ has been suggested to me by a friend, and I must acknowledge that if it would thrive here, it is likely to be a greater destroyer of vermin than all others. The large black ant of North America and Europe is known to every foreigner, and deservedly renowned for its strength and ceaseless labor. An anthill has its avenues to all parts of the surrounding country, and few worms would escape. The large ant does not, like the small one, settle down and become a nuisance in every house, but makes its own home on the field or hill, and never ceases to fill its larder.

It could not be any great expense to try getting the large black ant introduced, and when once numerous it is my impression that it would show itself very useful.

Respectfully your obd't serv't,

VALDEMAR KNUDSEN.

TRANSACTIONS OF THE
REPORT ON BEES.

LAHAINA, July 28, 1856.

Rev. A. Bishop, Chairman of the Committee on Birds and Bees:

DEAR SIR,—Captain Matthews W. Green, of the "Raduga," who was for many years settled in the neighborhood of Boston, gave much attention to horticulture, and particularly to the care of bees. He is very sanguine that he should succeed in bringing out a swarm to these Islands, and will probably attempt it, if he comes hither again.

Capt. G. lays much stress upon the importance of ventilation, and thinks that a hive could be so prepared, by covering the openings with wire gauze, as to secure the needful supply of air, and yet prevent the exit of the bees. I present this hint for what it may be worth.

The same gentleman gave me a valuable treatise on the subject, from which I had hoped to draw something that might be of value to the members of the Hawaiian Agricultural Society, but in the three removes which are as bad as a fire, the precious document has been mislaid, and I have deferred writing to you until this eleventh hour in the vain hope of finding it.

One question has suggested itself to my mind in estimating the probable productiveness of bees in this tropical region. It is this. How far can we rely upon them to lay up stores where they have no winter to provide for? Will they not speedily fall into the unthrifty habits of their new home, and learn to live, like their neighbors, "from hand to mouth?" Sad indeed it is to think that e'en "the little busy bee," may be seduced by the sweet blandishments of a perpetual summer, from that industry which is her crowning glory. Where then shall we point our children to an example? Parental instinct would still no doubt prompt to the gathering of those stores which the young bees will demand, but would this supply be sufficient to satisfy our desires?

I hear it often said, that we cannot have honey till we procure, not only bees, but the food which they will require. I see no cause for this remark. We have a great variety and abundance of flowers in our woods and fields,—the kukui, acacias of many varieties, hala,

hao, ki, banana, sugar cane, and a host of others. Let us have the bees, and I will guarantee them food enough.

Very respectfully yours,

EDWARD P. BOND.

REPORT OF THE COMMITTEE ON INDIGO.

By D. FRICK, L. L. D., *Consulting Manufacturing Chemist.*

A fair trial of nine months has given to us every opportunity for judging of the practicability and ultimate success of the manufacture of indigo from the indigenous plant of this archipelago. The obstacles to our progress in that industry having been independent of the Hawaiian indigofera, as well as of our own perseverance and knowledge of the operation, are then not of a nature to prevent that enterprise from being resumed under more favorable circumstances than those under which we were placed.

We had established our little works in the valley of Nuuanu, at a distance of about two miles from Honolulu. From 4 vats, with which we began, we had successively increased their number to 24, which gave to us 12 for the maceration of the plant, and 12 for the corresponding heating operation of the water charged with unoxycized indigo. Of these 12 vats, 4 were ready every day for oxydation, consequently 4 new ones were filled daily. Two native lads were employed to bring the required plant in, but for the great laziness of such hands, one might have been sufficient, during the maturity of three crops, in the wild condition of the plant. Two intelligent operators were required to beat these 4 vats until the oxydation of the coloring matter was completed, which, owing to our own process did not take more than half an hour per vat of two feet and a half to three feet in diameter, with a depth of about two feet; the same operation requires usually three full hours by the method generally in practice. The indigo suspended in atomic particles in the liquid, does not precipitate under three hours, by the ordinary process—we obtained that precipitation in about half an hour, which difference gave us for the two stages an advantage of about five hours over a similar

manufacture elsewhere. The filtering, boiling, and bagging of the paste, the division and dessication of the lumps cut into mercantile squares did but absorb the half of the operators' time, and with two hands, more for the feeding and emptying of the 4 vats as well as for the pumping for the maceration of the plant, double the number of our vats might have easily been worked.

Our proximity to the town was however an advantage purchased at the expense of many unfavorable conditions, arising chiefly from the inconstancy of the weather in that pass. Sun-shine being a valuable auxiliary to promote a good fermentation, our vats were but covered by the canopy of heaven during the day, at night they were under frames of sail-cloth, which entertained the required temperature without excluding altogether the air. The sudden squalls of wind and the heavy showers of rain which, so often rush through the valley, as out of the mouth-piece of a blow-pipe, are accidents that must prevent in future the establishment of indigo works in the same locality, for not only do they interrupt or stop altogether the fermentation, but the water added to the macerating liquid, causes an overflow that spoils entirely the operation. The pressure of these difficulties, so heavy against our efforts, was certainly a great draw-back in our produce, but a moderate living could still be obtained had we found at hand a market for the article. The absence of all home consumption, and our failure to dispose of the Indigo at San Francisco, had left to us no other alternative than that of shipping the goods for some great manufacturing district and wait for the returns. This being beyond our means, we were under the painful necessity of abandoning a labor for which a weekly salary was a vital condition for us. We have already mentioned that the indigo plant spontaneously growing on these islands is not one of the richest in quantity, but very satisfactory in quality, and in a normal condition of weather we produced invariably a first rate article. In fact, for the last four months of our existence, there was not a shade of difference in the brightness of our produce.

This quantity would besides be sensibly increased by a proper cultivation of the same plant, which might be sown at such intervals as to procure every month a crop ready to be cut in its flowering.

The first conditions of success depend then upon the locality and the cultivation. In that respect, Maui and Kauai seem to be very favorably situated; land with an abundance of flowing water and comparatively cheap labor may easily be obtained. We would recommend the construction of wooden troughs of the capacity of six or eight of our vats; they would both be cheaper, of a longer duration, and not subject to the repairs often claimed by vessels exposed to the open influence of the atmosphere.

The first expenditure for such a business, upon a large scale, would be but moderate, when compared with the certain profits of the operation. We are disposed to communicate our own process and improvements for a just consideration, to any party who should feel inclined to purchase the exclusive privilege of our knowledge, in that manufacture. We are also willing to direct for a short time, the works through all their stages, until a competent manager has been formed, under our tuition. Such a speculation, for any party that would not be pressed by time, for the realization of the profits, offers the rare guarantee of a sure reward, without any chances of a loss. And a new importance might be derived from the creation of small branches on the premises of the natives of the neighborhood, of whom the precipitated paste could be purchased at a fixed ratio per bucket, according to a similar contract in practice in China.

REPORT ON KUKUI OIL.

BY D. FRICK, L. L. D., *Consulting Manufacturing Chemist.*

To the President and Members of the R. H. Agricultural Society:

GENTLEMEN:—A most valuable tree is suffered to scatter its crops in the woods of this archipelago, where but a few of its nuts are picked up to lighten the long nights of the laziest among the natives, who are satisfied to use the kernel—their primitive luminary—instead of expressing its oil upon the wick in a burning apparatus. Some, but a very small number for the rural population, extract the oil for their lamps, and occasionally sell a few bottles of it. The late Mr. French, an intelligent and enterprising man in his time, had set up a mill to

produce that oil upon a respectable scale, but its imperfect principle, joined to the inducement of more profitable schemes, had led him to the abandonment of an industry that an enlightened perseverance would have raised to the rank of the best sources of fortune, from the natural richness with which Providence has gifted this country.

Believing that this subject should most essentially deserve the interest of at least the serious members of this Society, I beg to communicate to them the result of some experiments made by me to show how far I have succeeded in proving that this oil is susceptible of receiving the properties for many useful applications.

Of the six vials with which I intend to contribute towards your agricultural show, the numbers 1, 2, 3, contain samples of kukui oil obtained by the rude process of the natives; the light shade of difference perceptible between them is owing to the degree of terefaction which carbonized more or less the fluid and imparted to it that brown, opaque color. In this state the oil has received a body at the expense of its limpidity, and a certain virtue of siccative ness adaptable to painters' purposes. By the means of a combination of mineral acids, afterwards neutralized with a carbonate of lime, it freed this oil of its carbonized glutinous substance, and re-established its limpidity, but my agents awoke a yellow coloring principle which remained staining the oil, after all the saturation of the acids was completed. The oil marked No. 4 is an improved light generator and a capital body for saponification. No. 5 is a sample of that produced by the mill of Mr. Widemann, at Kauai. Its color announces a cold drawn oil, holding in suspension the less pure extract of the kernel's epidermis, which presence leaves a dullness in the fluid. Though less siccative than No. 4, it may be employed for light shaded paints, is a good lamp oil, and will make an excellent soap, provided that its rancidity is promoted to facilitate its combination with the caustic alkali, as the French do for their Marseille soap, made of the worst of olive oils.

With a careful operation, by the means of an alkalized substance that has more affinity for the impurities than for the pure oil, I obtained No. 6, which is a superior light provider, a good feeder for machinery, and a capital substitute for olive oil in the preservation of animal or vegetable culinary preparations.

These applications would already suffice to awake the attention of the enterprising members of our community, but I hope ere long to point out a new field for the consumption of this article. The merit of my manipulation consists above all in the cheapness of my *modus operandi*, which, including the chemical agency, the wear and tear of the apparatus, will not add above six to eight cents to the cost of a gallon of cold pressed kukui oil; and the latter might be produced for about fifty cents the gallon.

No author's sanguineness has deceived my estimation; the operation is as simple as it is efficient. If my sample is small, it is owing to the limited size of my utensils, for with a proportionate apparatus I could have produced a hundred gallons in the two hours that lasted the filling of the vial No. 6.

May this note be considered as a new proof of my desire to leave some useful traces of my exile in the Hawaiian Islands.

A few observations on the Nature of Arrow Root, and new applications for that Fecula.

By D. FRICK, L. L. D., *Consulting Manufacturing Chemist.*

In my endeavors to discover the attractive mover for the insects that invade the farinaceous substances, I have separated by lixiviation the gluten from the fecula in wheat flour, and soon ascertained that the gluten alone was the object of the insect's predilection. In its state of isolation in a compact body of adherent molecules, the insect's action is null, owing to the resistance of the surface of the substance which, through its contact with the air, is soon converted into a varnished coating, but in its state of combination with the fecula, when highly divided, it is in a favorable condition to tempt the insect. As to the fecula which, after its dessiccation, represented the same impalpable powder as before, that is to say, in a state of division proper to induce the introduction of insects, it remained untouched, whilst some flour placed near it was swarming with grubs and weevils.

Satisfied in my mind that fecula must be a kind of vermifugeous powder, I filled three tin boxes, one with wheat flour, the second with

the same but covered with an inch thick layer of fecula from arrow root—the third containing arrow root only. The three boxes were placed together within the reach of insects that we collected near to them. The first box, that of pure flour, was attacked almost immediately; the two others, though in contact with it, remained free of the nuisance during the eight days that the trial lasted.

In consequence of this satisfactory result, I recognize in the nature of fecula a virtue that is not only preserving for that farina itself, but for all dry subjects that would otherwise become a prey to the rapacity of insects. The covering with or packing in fecula will, in all such cases, become a protecting panacea that was for a long time wanting in the tropical climates particularly.

I have begun a series of experiments to establish how far the adoption of this process may extend its benefits, and I shall hereafter communicate to the public, through the press, all the information which my intelligence may derive from my researches on that interesting subject.

I take the opportunity of this general meeting of my colleagues of the Royal Hawaiian Agricultural Society, to introduce to our community at large this new property of one of our staple articles of home produce, the arrow root.

I should add that I have employed on purpose fecula of that tubercle that was considered of inferior quality, being more or less stained by the want of care in its preparation, and which shade is chiefly due to some particles of the eyes and pellicula that were not cautiously removed; but that imperfection which affects merely the appearance of the arrow root is no impediment in my application, which will open a consumption for secondary sorts of this article, and reduce, by their cheapness, the cost of their employ.

REPORT ON COTTON

Mr. President:

At the request of many members, I submit a few remarks on the subject of Cotton.

About eighteen months ago, my attention was called to the cotton tree, (I cannot call it a bush) growing at Lahaina. Upon inquiry, I was surprised to find it had been fifteen years growing from the seed.

Sample No. 1, is some I gathered from the original tree.

Sample No. 2, is of my own raising from seed of the original tree. It was of very rapid growth, and in less than five months was ready for picking; and both in quality and weight was greatly superior to that from the original tree.

The Sea Island is the only kind growing at the islands, so far as my information extends. Its growth is amazing. That which I planted ran over twenty feet.

There are thousands of acres on the island of Maui adapted to the growth of cotton, as it requires a dry, loamy soil; and from information derived from Rev. Mr. Taylor, of Hawaii, I have no doubt there are also large tracts on that island adapted to the cultivation of cotton.

A great advantage at the islands over the United States, in the cultivation of cotton would be, that it does not require here to be planted every year, while cotton could be picked ten months out of every twelve. In the United States they raise from five to eight hundred pounds to the acre; here, say you raise five hundred pounds the first picking, and five hundred during the remaining five months, and you have a thousand pounds to five or eight hundred in the same time. In the States it has to be planted every year, while here, it would not require to be planted oftener than once in five years, and it would neither decrease in quantity nor deteriorate in quality sufficient to justify its planting oftener.

So far as my observation extends, the cotton plant here has fewer diseases than in the States, only the boll-worm and the cotton lice, and these to no great extent.

In planting here I would recommend to have the plants about eight feet apart, or nine feet, if the soil is very rich and strong. The plants will require different treatment in different localities, and experience alone can direct the farmer.

Seed for planting should be ginned immediately, and spread upon the floor to dry. If the cotton seed be not wanted, pack the seed cot-

ton away in the house, to remain until a gentle heat is perceived, when it is in a good condition to gin. When heated so as to become perceptibly warm to the hand, it should be opened and spread out to cool. Cotton thus heated will gin faster and have a softer feel, will not be so brittle and will have a rich creamy color.

The seeds are useful for oil, and as food for hogs; thrown in a pile until they become heated, they are good for manure.

Respectfully submitted, F. A. OUDINOT.

REPORT ON TOBACCO.

Acting for the Chairman of this Committee, whose ill health causes his absence, I can, in a report on tobacco, do little more than furnish to the Society such statistical information as we have been able to collect concerning the manner and quantity of the growth of tobacco here, and the amount exported and imported.

Though tobacco is said to be one of the natural products of this country and capable of growth in any quantity, its cultivation as a business is still confined to one portion of the Island of Kauai, where this year will be cured a crop of probably 60,000 lbs., said to be equal in quality and flavor to any tobacco in the world. The cost of the production is estimated at four cents per pound, and of the manufacture of cigars at four dollars per thousand, for which it takes twenty pounds of tobacco.

In cigars I think we have made a decided advance, and that some now in the market from the manufactory of Mr. Opitz will bear comparison with the best imported ones.

There are now manufactured on Kauai one thousand cigars per day, for which will be obtained prices varying according to quality, probably from ten to fifteen dollars.

The Custom House books show the imports during 1855 to have been 48,703 lbs. of tobacco, valued at \$7,854 35, and 1,881,500 cigars, valued at \$22,245. No exports.

During the six months of the year ending June 30, 1856, the imports have been of tobacco in boxes, of which the weight is not stat-

ed, \$468 73; of cigars, 605,300, valued at 6,294 17. The export of tobacco, 1,420 lbs., \$205 35.

Accompanying this is a letter from Mr. Archer to Mr. Lee, which is in itself a better report on tobacco than any I could prepare, and to the concluding part of which I beg to call the special attention of the Society.

M. C. MONSARRAT.

РОКII, July 16, 1856.

Hon. W. L. Lee, Chairman of the Committee on Tobacco:

DEAR SIR,—As I am the only one, of those placed on the committee on tobacco, who is engaged in its cultivation, it is probably expected that I should communicate our experience since my report of 1854.

For raising tobacco we have found the method recommended in my last report to answer the purpose perfectly, and we have this year by following that plan, raised above 30,000 lbs. without a worm-eaten leaf. If therefore, the production of tobacco consisted merely in growing it, I should think it unnecessary to add anything to my former report, but as experience has taught us that curing is of equal importance, I have to confess that that part of my report in which I treat of curing is perfectly worthless.

While harvesting the latter part of the crop of '55, we made some experiments in curing, with results that encouraged us to hope that we had at last hit on the proper method, and we have put the whole of this year's crop through the process then discovered with the best results. It is now our firm conviction that we have cured tobacco that can be manufactured into superior cigars, and we will give the public an opportunity of deciding whether we be right or wrong, as soon as the tobacco has acquired age enough to make it fit for use—say in six or eight months from now.

If I do not at present give an account of the process we have used, it is not that I wish to have its virtue proved by time before I do so. I should not like to have a second time to confess that what I had written on the subject was worthless. You must not suppose that we

have any wish to keep our discovery—if such it is—a secret, in order that others who engage in tobacco growing may have the same weary years of disappointment to wade through that we have had.

In conclusion, I may perhaps be allowed to remark, that had the suggestion of J. F. B. Marshall, Esq. when Vice President for Kauai been attended to, viz: for the Society to open a correspondence with Havana, for the purpose of ascertaining the process there employed in curing tobacco, we might perhaps during the last year, have been supplying the smokers of Hawaii with cigars, equal or superior to the imported Manila. By the list of corresponding members, I observe there is one for Havana, and I can imagine no more legitimate way in which the Society could make itself useful than by supplying such special information as individual members may apply for.

Your obedient servant,

A. ARCHER.

NOTICE.

The Board of Managers of the Royal Hawaiian Agricultural Society hereby give notice to the members, and the public generally, that the Room over Dr. G. P. Judd's office, corner of Merchant and Fort streets, has been engaged for the use of the Society, where may be found the Library of Agricultural and other works belonging to the Society, in charge of J. E. Chamberlain, Esq.

It is the desire of the Society to form a collection of specimens of the various productions of the Islands, and of their geology, mineralogy, conchology, entomology, &c. For this purpose they solicit the co-operation of all persons interested in these objects. Donations of Books will be gladly received.

Masters and officers of whale-ships are respectfully invited to aid the objects of the Society. Seeds, plants, trees, useful animals, and especially insectivorous birds, will be gratefully received, and valuable additions to the varieties now existing on the Islands may in this way be made.

It is thought that Deer will thrive and increase rapidly, if once introduced here. Whaleships visiting the California coast might readily procure them, at a trifling expense, which would be paid by the Society. Mr. Chamberlain will take charge of all articles that may be forwarded.

J. F. B. MARSHALL, President.

NAMES OF THE MEMBERS OF THE ROYAL HAWAIIAN AGRICULTURAL SOCIETY.

LIFE MEMBERS.

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Booth, Joseph	Meek, John
Brewer, Chas. 1st	Miller, Wm., H. B. M.'s Consul General.
Cummins, Thos.	Montgomery, John
Janion, Robt. C.	Peirce, Henry A.
Kamehameha, H. H. Prince Lot	Pitman, Benj., Vice Consul for Chile.
Kenway, Geo. S.	Wood, R. W.
Lee, Wm. L.; H. H. M.'s Chief Justice.	Wyllie, R. C., H. H. M.'s Min. of Foreign Relations.
Makee, Jas.	
Marshall, Jas. F. B.	

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Adams, D.	Brewer, C., 2nd.
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Alexander, W. P.	Chamberlain, J. E.
Allen, E. H., H. H. M.'s Min. of Finance.	Chamberlain, W.
Andrews, C. B.	Clouston, Robert
Andrews, L., sen., H. H. M.'s Judge of Probate.	Cummings, P.
Archer, A.	Damon, S. C.
Armstrong, R., Pres. of Board of Public Instruction.	Dwight, S. G.
Austin, J. W.	Emerson, J. S.
Baldwin, D.	Everett, A. P., Consul for Chile.
Bartow, C. S.	Flitner, D. N.
Bates, A. B., H. H. M.'s Law Ad- viser.	Fornander, Abraham
Bishop, C. R.	Frick, D.
	Fuller, J.

Gilman, G. D.	Marsh, J. W.
Goodale, W., Collector-General.	Metcalf, G.
Gower, G. D.	Moffit, R.
Gower, J. T.	Monsarrat, M. C.
Green, J. S.	Melchers, G. C., Consul for Bre- men.
Green, W. L.	Moll, Ed., Consul for Hamburg.
Gulick, P. J.	Oudinot, F. A.
Gregg, D. L., U S. Commissioner.	Parke, W. C., Marshal Hawaiian Islands.
Hackfeld, H., Consul for Sweden and Norway.	Pease, W. H.
Hall, E. O.	Pflugger, J. C., Acting Consul for Sweden and Norway.
Hardy, Jacob	Reiners, G., Consul for Prussia.
Harris, C. C.	Robertson, G. M., Associate Jus- tice Sup. Court.
Heuck, C. T.	Robinson, Jas.
Hillebrand, Wm.	Rooke, T. C. B.
Hoffmann, Ed.	Strong, Rev. J. D.
Hoffmeyer, S.	Torbert, L. L.
Holdsworth, H. S. H.	Taylor, T. E.
Holt, R. W.	Von Holt, H.
Hopkins, Chas. G., Director of the Government Press.	Webster, Wm.
Howland, H. S.	Weston, D. M.
Ii, Jno., Associate Justice Sup. Court.	Widemann, H. A.
Ingraham, G. B. C.	Williams, Geo.
Johnson, Samuel	Wood, J. H.
Jones, Wm. Ap	
Knudsen, V.	
Lathrop, G. A.	
Lawrence, Robert	

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- Bond, Geo. W., Boston.
Bowring, John, LL. D., H. B. M.'s Consul, Canton, China.
Bridge, Horatio, Purser U. S. Navy.
Dennison, Capt. Sir Wm., R. E., Lieut. Gov. of Tasmania.
Dickson, Geo. Fred., London, England.
Ellsworth, Hon. Henry L., Indiana, U. S. A.
Emmons, Prof. Ebenezer, Albany, N. Y.
Ewbank, Hon. Thos., U. S. Com. of Patents, Washington, D. C.
Fell, William, San Francisco.
Grey, Sir George, Governor of New Zealand.
Henry, Joseph, LL. D., Smithsonian Institute, Washington, D. C.
Hooper, Wm., San Francisco, Cal.
Johnson, B. P., Albany, N. Y.
Johnson, —, M. D. Tahiti.
Klee, Mons., Guatemala.
Lee, Hon. D., Georgia, U. S. A.
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Seaman, Berthold, London, England.
Skinner, John S., Washington, D. C.
Teschmaker, Jas. E., Boston, U. S. A.
Vattemare, Alex., Paris, France.
Velasquez, Don Jose Maria, Havana.
Warren & Son, San Francisco, Cal.

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