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PHILIPPINE GEOGRAPHICAL JOURNAL

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Editorial

This year is the twenty-first year of the Philippine Geographical Society. It may be recalled that the following editorial by William J. Ellis, former editor, and article by Dominador Z. Rosell, business manager, were published in the No. 1 issue of Volume I (1953) of the Society's Journal. These two articles are reproduced herein to restate the position of the society in connection with the aims and objectives of the NEW SOCIETY.

THE JOURNAL AND THE SOCIETY

This marks the first issue of the journal to be published by the Geographical Society of the Philippines and its main purpose is to help implement the objectives of the society.

Like many of the sciences, geography is assuming more and more importance in the world today and it is essential that a society should have been formed for the furtherance of the subject in a country of growing importance in the world like the Philippines. The enthusiasm shown by a number of Filipino and American geographers, scientists and businessmen who are interested in the application of geographical knowledge in education, government, business and in other activities has stressed the need which it is hoped this journal will fulfill. Geography may be said to be the science of the earth and the life upon it, so that it covers not only a broad field but an important one. In very recent years when so much is being talked about economic development and the utilization of hitherto untapped reserves of natural resources it is self evident that the pursuit of the science of geography has a significant contribution to make.

The renewed interest in the subject in this country is stressed and in order to strengthen this branch of science and the new society the collaboration of all those interested is sought. Both the academic and the practical aspect of the subject should be considered and in large measure their importance to the advancement of knowledge and progress should be kept in mind.

An interest in the subject is sufficient to qualify for membership and it is the maintenance of this interest which will ensure the success of the journal.

It is hoped that this issue will be the forerunner of what will be the largest and most significant publication on Geography in this area of the world. — W. J. E.

THE BIRTH OF THE PHILIPPINE GEOGRAPHICAL SOCIETY

by

DOMINADOR Z. ROSELL

Nine years after the attack of Pearl Harbor and Manila which started World War II in the Pacific area, geography as a scientific and social discipline in the Philippines was recognized by a number of American and Filipino geographers, scientists and businessmen. The organizational meeting was a simple affair with Dr. Jose M. Feliciano, Head, Geology and Geography Department of the University of the Philippines, Dr. Alden Cutshall of the University of Illinois, then Fulbright Professor of Geography in Manila, Dr. William J. Ellis, then Principal Science Officer of the United Nations in Manila, Mr. J. D. Coon, Assistant Manager of the International Harvester of the Philippines and some soil technologists of the Soil Survey and Conservation composing the founders of the organization. D-day was December 8, 1950.

The committee to draft the constitution was created with Dr. Alden Cutshall as Chairman, Dr. William J. Ellis, Mr. Domingo Salita and Mr. John D. Coon, members. The original draft of the constitution was amended and ratified by the members of the society at the meeting held on December 23, 1950 at the Soil Conservation Building, Florida Street, Manila.

On March 15, 1951, the membership of the society increased to thirty three (33). During the meeting held this day, the officers were elected, namely, Dr. Jose M. Feliciano, president, Dr. William J. Ellis, vice-president, Mr. Dominador Z. Rosell, secretary and Mr. Arturo Alcaraz, treasurer. During the first year of the society, two geographical communications were printed and distributed. Communication No. 1 — Education in a Geographic World by George T. Renner, was mimeographed by courtesy of Benitez and Company while Communication No. 2 — Dynamic Geography by Alden Cutshall, was mimeographed by courtesy of the International Harvester Company of the Philippines. Everything was going well for the first year. The year 1952 was a dormant year but this year 1953 will see a revival of the society's activities.

GEOGRAPHY — THE CORE IN THE UNITY OF KNOWLEDGE[1]

By

DOMINGO C. SALITA[2]

The study of the earth and its inhabitants is one of the most fascinating studies known to man. The term geography is derived from the Greek word "geographia" which may be translated as "earth description." Today, as in the past, Geography is a broad division of human knowledge which is concerned with the study of the earth and its relation to the social, economic, and political activities of man. Man is born on the earth's surface where he makes his living and eventually dies therein. His knowledge of his environment, physical, biological, and cultural becomes more and more significant if only he has to live a fuller and a better life.

The historic concept that geography is a description of the earth is no longer adequate to meet the modern concept of geographical science. It is not a mere enumeration of rivers, mountains, lakes, cities, and capital towns. Webster defines geography as the science of the earth and its life especially the description of land, sea, air, and the distribution of plants and animals including man and his industries with reference to the mutual relations of these diverse elements.

What then are some of the big concepts and viewpoints of Geography? In the development of geographic thoughts five great traditional ideas are herein presented in their chronological order.

Firstly, the man-land relationship concept. It is fundamental that any scientific endeavor depends first and foremost in careful observation. Here the Greeks led the way. They described the topography of the land and correlate it with the character and customs of the inhabitants. Thus Herodotus who is recognized as the father of both geography and history explained the cause of the fertility of the soil of the delta of the Nile and its influence which made it a cradle of ancient civilization.

In the Philippines the man-land relationship can be observed in many parts of the country. In the Ilocos coastal plain for instance where the arable land is limited the inhabitants have developed the habit of industry and frugality. The nearness of the place to the shores of the China Sea as well as its limited resources have given the inhabitants the vision to migrate to other lands and to seek for new and better opportunities.

The Ifugaos of the Mountain Province who built the rice terraces at Banawe, as the 8th wonder of the world, show a clear adjustment

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[1] Delivered before the Institute of Social Studies under the Social Studies Research Center, Department of Education & Culture on May 6, 1974.

[2] Vice-President, Philippine Geographical Society and Dean, College of Arts and Sciences, University of the Philippines Systems, Diliman, Quezon City.

of man's use on the land. The land provides the possibilities but it is up for man to use and modify it according to his needs. A place may have rich natural resources but it is up for the industry and character of man to make it viable and progressive. Japan is a country with rugged relief and poor natural resources but it is more economically advanced than the Philippines.

Secondly, the space and location concept. This aspect of geographic thought studied the shape of the earth and devised a system of locating the continents and the oceans and their features. This brought about the development of the grid system of longitude and latitude on the globe and their projections on plane surface to form the real maps.

The zones of latitudes which divide the earth into heat belts arose the concept of torrid, temperate and frigid zones. The temperature of a place therefore is greatly dependent upon its latitudinal location. Thus the location of the Philippines between 4°23′ to 21°25′N latitude, which is within the zone of low latitude is mainly responsible for the moist warm climate that we enjoy. The longitudinal location of our country between 116° to 127° East, placed the Philippines some eight hours ahead of the time of Greenwich, London.

The development of map making has encouraged man to travel far and wide which brought about the discovery of new lands and the unknown world. Thus the discovery of the Americas and the Philippines by the Europeans was partly due to the development of map making. Today, maps find their usefulness not only as guide to tourists and travelers but also as tools to portray information about the features of any particular place. Thus we have the physical and political map of the Philippines that depict the landforms and political boundaries of the different cities and provinces.

Thirdly, the dual nature of geography provides the connecting link between the natural and the social science disciplines. The study of the earth, its composition and processes which include the lithosphere, hydrosphere, and atmosphere are physical in nature. All the processes and resulting features can be studied through the methods used in physics and mathematics. But the field of geography is not limited to understanding the physical phenomena but also interprets the influence of the natural features and processes to the varied activities of man. Thus the distribution of human settlements and industries are affected by the configuration of the land and the available resources.

Geography concerns itself with the study of two inter-connected streams of inquiry. One aspect is known as physical geography and consists of the systematic study of the origin, distribution, and significance of the major physical features of the earth such as landforms, climates, the oceans, and the natural resources. The other division is called human or cultural geography and gives emphasis on the study of man's imprints upon the earth. Such subjects as the distribution of population, various settlement patterns, and the features resulting from man's productive activities in earning a living fall within this province.

This unique position of geography and the richness of its contents provide a common territory for the sciences and the humanities to meet. It integrates and unifies the various disciplines that has something to do with the earth's surface. As a natural science, it finds com-

mon ground with geology, biology, astronomy, meteorology, and oceanography; while in the social science and humanities aspects, it is linked with history, economics, political science, anthropology, sociology, and demography. Because of this, Sir Patrick Geddes called geography the "synthesis and mother of all sciences." It is the common core in the unity of knowledge.

Fourthly, the concept that Geography is the study of places or spaces. First of all, "place" means a specific or unit area which is identified by its given name, such as the Greater Manila Area, the Philippines or Southeast Asia. The questions that are usually asked about the place are: Where is it located? What are its products and resources? How big is the land area and its population? These and several others will make the place unique and distinct from any other place on the globe.

In the study of the Geography of the Philippines for instance, we take up its location, size, shape, landforms, climate, and natural resources as well as the human and cultural elements. The maritime location of the Philippines led us to adopt the archipelagic doctrine so that the bodies of water separating the more than 7,100 islands shall be looked upon as part of the total land mass. This is significant for our own national interest. The size of our country should not be compared with the size of the former mother countries where we will be dwarfed as a small territory. Instead, we should be reckoned with the average size of the states of the world and in this context the Philippines will not emerge not as a small territory but a medium-large state. The fragmentary character of the Archipelago will make us understand the Filipino attitude of regionalism and why the solidification of our country into a coherent nation profession one common ideal and aspiration is taking place slowly. Our climate provides us splendid opportunities for adjustment. Thus our periods for vacation are made to coincide with the hot summer months where man's climatic energy is at its lowest. It may interest you to know that in the tropics a mean temperaure of about 73°F (23°C) is conducive to the greatest efficiency of man. Our mean annual temperature is 80°F and during the summer months the mean monthly temperature goes up to 84°F. The planting of our crops should be timed so that they will be harvested before the approach of the typhoon season. The nature of our landforms and rich natural resources provide the potential for national wealth. But these resources like the forest, the minerals, the soils, the waters, and fishery resources are not inexhaustible. They belong not to the present generation alone but also to the future generation yet unborn. It becomes our duty to spread the gospel of conservation, to use our resources wisely and economically. The goals of conservation should be taught in all levels of education so that life in this part of the world shall remain vibrant and progressive.

The approach to the study of any area or place is both systematic and chronological. The focus is upon distribution and associations and with area inter-relationship. This enable man to realize of his dependence with other countries. Thus, the oil crisis in the Middle East has affected our national economy. Viewed from world perspective the study of geography may enhance the promotion of international peace and understanding as nations are interdependent with one another.

Fifthly and lastly, the modern concept of Geography is the study of the earth as the home of man. The earth includes the totality of man's environment, the physical, biological, social, and human environment. It is not the natural environment alone that affects man but the cultural environment as well.

As population grows, the demand for space and the basic requirements for food, shelter, and clothing becomes more and more acute. To meet these needs man has endeavored to transform an agricultural into an industrial economy. In the process, however, the quality of the environment may be impaired which will in turn affect the quality of life. Thus in putting up a plywood and lumber factory, a chain of events takes place. The cutting of the forest if proper safeguards are not observed may bring about rapid soil erosion and the consequence of floods. These are now being observed in our country which in the past were unknown. The factory may discharge gases which may pollute the atmosphere. The liquid effluents may be discharged through rivers and lakes which may in turn destroy the fishes and other biotic life in these bodies of water. This may deprive the fisherman of his source of livelihood. Proper regulations should be made so as to meet the rising expectations of our people and at the same time maintain the quality of our environment. The study of geography which is environmental oriented has become more relevant to our daily and national life. Thus the President of our Republic has decreed that no hazardous factory shall be constructed within a 50-kilometer radius from the City Hall of Manila. This is geography in action.

These five great traditional concepts of Geography are by no means distinct and exclusive from each other. Each emphasizes a certain aspect of geographic study. The geographer must learn the five major spheres of the earth: (1) lithosphere, the solid portion, (2) hydrosphere, the water portion, (3) the atmosphere, the gaseous portion, (4) the biosphere, the plant and animal life, and (5) the homosphere, man and his culture. All of these are part of the whole and together they serve the purpose of geography: to understand the earth as the habitat of man.

The natural and cultural environment influence man's ways of living. It provides the stage but it is the human mind, character, and industry that determine the ways in which life is lived in this planet. Man can modify his environment and with improved knowledge in science and technology he can harness and develop the earth's resources to enable him to live a richer and a more abundant life.

THE IMPACT OF IPOMOEA BATATAS ON NEW GUINEA HIGHLAND AGRICULTURE AND AN INVESTIGATION OF ITS ORIGINS

by

LARRY N. GARRETT[1]

The concept of cultural diffusion, and more specifically in this paper of plant diffusion, has long been of keen interest to geographers. The sweet potato (*Ipomoea batatas*), an externally introduced plant, had profound impact on the socio-economic infrastructure of the New Guinea Highland agricultural system and its ramifications were felt in such diverse areas as population densities and trade relations. This paper examines this impact and traces the origins of this plant.

The scope of this paper is purposefully rather limited. The basic intent is to examine the impact of an externally introduced innovation on a remote and "isolated" cultural entity. Specifically, an examination is made into the impact of the sweet potato, *Ipomoea batatas,* upon New Guinea Highland agriculture. The ramifications of this impact are far-reaching (economic, social, and so on) and the difference between Highland and Lowland agriculture is pronounced.

There has been no attempt in this paper to divide New Guinea into political sectors. If political boundaries were really meaningful in the sense that a real change from one area to another was indicated, there would be some justification for recognizing the lines. For example, the Tsingling Shan of China and Río Bio Bio of Southern Chile indicate real changes in the landscape as well as cultural change, but the artificial boundaries of New Guinea do not. Therefore, in this paper "New Guinea" refers to the entire Island entity.

Finally, many questions are raised in this paper and are left unanswered. This is as it should be. The impact of the *Ipomoea batatas* is far from complete. As accidentals move closer to the Highlands and as the indigenous groups adjust their lifestyles to new external innovations, the *Ipomoea batatas* will take on a new importance. For example, just *how* large a population can it support? With accidental techniques how much can be produced? The story of the impact of the sweet potato on the New Guinea Highlands remains very much an open book.

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New Guinea is the second largest island in the world, and is exceeded in size only by Greenland. The island is situated between about latitude 1°S and 11°S and longitude 132°E by 151°E. The island is presently composed of two political entities: West Irian in the west (Republic of Indonesia), and Papua-New Guinea which "tiptoed into self government"[2] on December 1, 1973. This new country of 2.5 million persons (and some 700 jungle tribes) faces separatist movements in Papua headed by such leaders as 32-year old Josephine Abaijah, but these interesting developments are best left to the political scientist.

The island of New Guinea comprises 320,000 square miles and is 1.500 miles wide at its greatest width (NW-SE) and 430 miles N to S. This is a coastal zone and a mountain "core area" where same peaks reach elevations of 15,000 feet above sea level. The "natural vegetation" is one of various types of rainforest. The climate is tropical and humid with 30" to 230" of rain annually.

Often, the mental image one holds of New Guinea is of a remote and isolated land where stone savages still practice cannibalism and hunt heads. One's mind's eye can see the brooding rainforest of ebony, sandalwood, cedar and camphor trees where the cool darkness is shattered by the violent explosions of color as birds of Paradise take wing. One can almost hear the sleepy splash of paddles as the natives ply the coastal waterways in search of food, and feel the hushed groan of the forest as the wind brings rain.

This image of New Guinea is not entirely wrong and is based in fact. Doubtless, it is the writings of travellers in New Guinea such as Octavius C. Stone,[3] E. Baxter Riley,[4] and Beatrice Grimshaw[5] which have helped to impress these images on one's mind. Often these travellers wrote in an anthropological-ethnographical vein, and their writings are not only educational and informative but usually quite engrossing.

One example of this genre of materials will illustrate the mood often established. M. Leahy[6] made nine journeys into the New Guinea Highlands between April, 1930, and September, 1934. The material he has written may be termed as "natural history," but while he was interested in the socio-economic infrastructure of the native economy he was also interested in panning for gold in the stream gravels of the many rivers draining the Highlands. New Guinea is known to contain gold and silver as well as platinum, copper, and osmiridium. On his fourth journey Leahy made the following entry in his diary:

"May 3rd 1931

Surrounded and attacked by a mob of Kukukukas just before daylight. Succeeded in driving them off after killing six of them, my brother Pat getting an arrow through his left arm and another one in his right lung, and I being knocked out by a blow on the head with a pineapple club and an arrow which grazed my cheekbone."

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[2] Atlanta, Georgia, *Journal and Constitution*, December 2, 1973.
[3] Stone (1880).
[4] Riley (1925).
[5] Grimshaw (1911).
[6] Leahy (1936).

Leahy and his party did not reach a doctor and medical attention until they reached Lae on May 14th, but, miraculously, all recovered.

While these and other accounts have reinforced the idea that New Guinea has always been remote, isolated, and removed from the mainstream of world affairs, authorities who have systematically studied the Island have begun to come to new conclusions. It appears as if New Guinea has actually been subject to externally induced innovations and crops which have had drastic effects not only on the agricultural system but on the socio-economic institutions as well. Before examining possible sources of this innovation it would be well to explore some of the diverse elements of New Guinea society.

Howlett[7] notes that almost *no* questions of origins, migrations, and prehistory of the New Guinea peoples can be categorically answered. However, she reports that the earliest peoples probably came from Asia at least 20,000 years ago. Today there are three dominant ethnic types: Negritos, Melanesians, and Papuans. Contemporary New Guinea groups have no written history and most groups have no calendrical system. Unlike much of Polynesia, New Guinea groups do not memorize extensive genealogical data. There are currently 500 languages in Eastern New Guinea alone and these languages belong to two groups. The first language group, the Melanesian subfamily, is spoken primarily in the coastal lowlands while the second, non-Austronesian, is spoken primarily in the Central Highlands. Spencer and Thomas[8] report 700-800 linguistic groups for the Island overall.

Howlett[9] offers some overgeneralized physical "norms" of the New Guinea indigenous tribes. The natives are of medium stature with dark skin, crinkly negroid hair, and rather heavy features. The Highlanders as a whole are shorter, stockier, and more muscular than the coastal peoples. The lowland Sepik look more like Highlanders while the Kukukukuku (who attacked Leahy) are almost pygmie-like.

In the lowlands the indigenous tribes are collectivists who not only hunt and fish but who also practice shifting cultivation. Population densities are under 25 psm. "The peoples of the New Guinea Highlands," on the other hand, "practice a more *advanced* agricultural system, made posssible by a combination of environmental conditions and better cultivation techniques."[10] The Highlands form a "central spine" for the Island which is 1,100 km (1 km = 0.6 mi) long. There are approximately 750,000 people who live in the Highlands and population densities are 40-185 pskm.[11] The Bulmers[12] report that "there are 200 or more people to the square mile in at least three parts of the Western Highlands (at 6,000 ft. and above): Mt. Hagen, Upper Lai Valley, and the Upper Chimby Valley." Spencer and Thomas[13] report 500 people psm in some areas of the Highlands. Figure I is

[7] Howlett (1967).
[8] Spencer and Thomas (1971).
[9] Howlett (1967).
[10] Howlett (1967).
[11] Waddell (1972).
[12] Bulmer, Susan and Ralph (1964).
[13] Spencer and Thomas (1971).

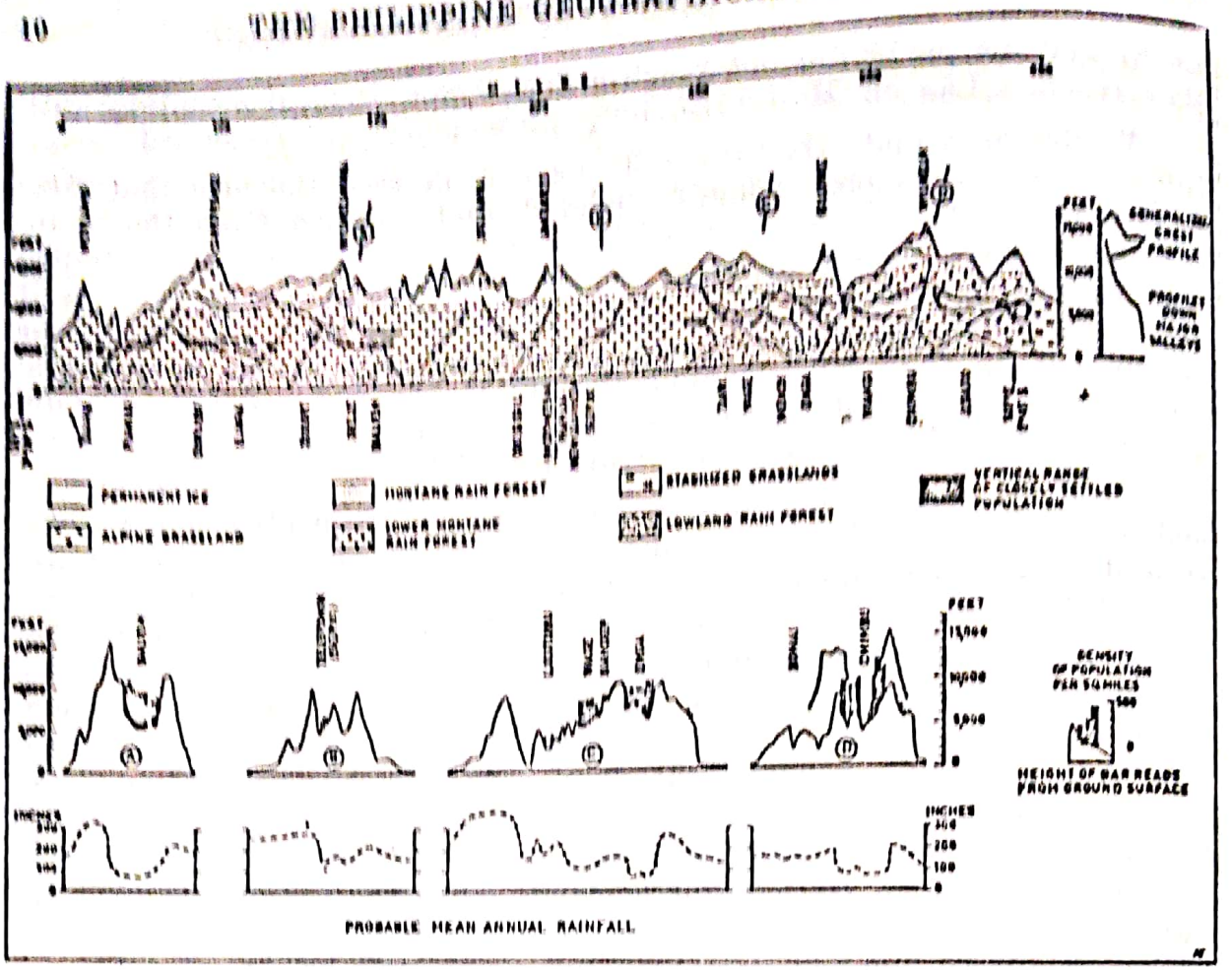

FIGURE 1 — THE VERTICAL DISTRIBUTION OF POPULATION IN THE HIGHLANDS.

useful in illustrating vertical Highland population distribution. While a more meaningful figure would be population density per square arable acre or unit of land this was impossible to obtain. The population psm is indicative of the discrepancy of distribution between the Highlands and Lowlands.

One questions this discrepancy in population densities as well as cultivation techniques. What types of agricultural techniques are practiced in the Highlands which are not practiced in the Lowlands? Do the populations of the Lowlands use the same types of crops? If not, why not? Generally, what factors have contributed to the resource base in the Highlands which supports a larger population? In order to answer these questions, it is appropriate to examine both agricultural systems in some detail, and in order to provide a basis for comparison the Lowland agricultural system is examined first.

Lowland agriculture is primarily slash and burn and is practiced in forested, not grassland, areas. Small trees are cut, and larger ones are killed (by ring-barking), and sunlight is allowed on the soil. Debris is burned. Small irregular plots are planted randomly but crop distribution is "often carefully planned"[14] especially on sloping land.

Source:
Brookfield, H.C. "The Ecology of Highland Settlement: Some Suggestions." *American Anthropologist*, Vol. 6:11, 1964, 23.

[14] Howlett (1967).

Staples (especially taro) are given the best land and crops are invariably inter-planted. Sauer's [15] idea of a microcosm is well illustrated. There are ground crops like sweet potato, middle-level yams, climbing beans, manioc and corn, and, finally, tall crops like bananas and sugar cane.

There is no definite season but plantings may follow rains. Clearings, of course, are usually made in dry periods. There is no fencing except to keep out pigs. Planting methods are typical of shifting cultivation and the soil is hardly disturbed.

The one staple throughout the Lowlands is taro which ". . . prefers moist soils of moderate fertility." [16] In more fertile areas (perhaps volcanic soils) yams may replace taro as a staple. Cassava, while widely grown, is protein deficient and is only a staple in areas of saline soils. Throughout the lowlands sweet potato is a subsidiary crop. Other crops include bananas, sugar cane, maize, various climbing beans and leafy vegetables while trees include coconut (close to the coast), breadfruit, pawpaw, various nut-bearers, and sometimes sago.

After planting gardens get little attention. Taro competes well with weeds and matures in six to twelve months. Plots are only used two to three years and often only one year.

Gardens are often cleared and planted serially, not simultaneously, to insure a steady diet. "Where there is pressure on the land resources, clearing and cultivation after inadequate fallow periods eventually leads to the repression of forest trees and their replacement by grasses." [17] In the lowlands these grassy areas become "deserts" and useless because of the indigenous groups' reliance upon slash and burn techniques and inability to use more intensive types of agriculture.

Highlanders also use fire, similar tools, and they must fallow to restore fertility but their system is more *labor* intensive and they utilize, primarily, grasslands. The origins of these grasslands are peculiarly important. Waddell [18] reports that except for rare alpine grasses the natural vegetation of New Guinea is one of various rainforest. He also writes that ". . . intensive agricultural activities within the valleys have resulted in a generalised (*sic.*) deflection to stabilised (*sic.*) grasslands." Howlett [19] notes that these grasslands are fire resistant and perhaps pyrogenic. The question arises: if, in fact, these grasslands are man-induced and if, as Howlett suggests for the lowlands, there is a significant positive correlation between this induction rate and population pressure upon the primary resource, land, did the process of deflection from one climax vegetative type (trees) to a second (grasses) occur *because* the Highlanders adopted sweet potato cultivation or as a *result of* that adoption? That is, were grasslands induced because of the particular cultivation-type necessary for the tubers' growth or because the plant allowed a more dense population and this population, in turn, placed extreme pressure on the land which resulted in the grass-inducing process of the lowlands. If this latter thesis is true then the more dense

[15] Sauer (1956).
[16] Howlett (1967).
[17] Howlett (1967).
[18] Waddell (1972).
[19] Howlett (1967).

the population and the more extreme the population pressure upon the land then the more extensive the grasslands would become. Or was the population pressure so great *before* sweet potato introduction that the grasslands were already developed? If this is true then the assimilation of this cultivation would be accelerated. While these questions are not the main focus of this paper, man-induced landscapes are of extreme interest and this could prove to be a fascinating area for research. These questions will take on more meaning as one reads further into this paper on sweet potato introduction, but they will not, of course, be answered definitively.

Watson [20] writes that "the orderliness and scale of subsistence activities in the Highlands contrasts sharply with the food quests of lowland peoples." Howlett [21] terms upland cultivation a rotation system as opposed to lowland shifting cultivation. Gardens are often regular in shape or internal layout and this is often because of the necessity of water control. "The neatness of highland gardens is in marked contrast with lowland plots: seen from a distance they resemble checkerboards or patchwork quilts of dark green against the pale greens of the grasses in the surrounding fallow land beyond the fences." [22] "Gardens, in contrast to plantings, are readily recognizable as larger, more orderly in appearance and extensively *tilled*."[23]

Extensive tillage is necessary to eradicate completely the grass cover. Other basic techniques include: widespread ditching, mulching, and planting of a tree fallow cover. Watson[24] reports that this cover is commonly casuarina and Howlett[25] notes that this casuarina promotes soil regeneration by its nitrogen-fixing contribution. The *Encyclopaedia of Papua and New Guinea* (1972) reports that short fallow periods are followed by long cultivation periods and frequent re-cultivation before fallowing. Howlett [26] points out that sweet potato beds are drained and that there is construction of soil-retention barriers on slopes and Watson [27] reports "very infrequent" slash-and-burn techniques.

The one most distinctive feature of Highland agriculture is the almost *total* dependence of the population on the sweet potato (*Ipomoea batatas*). Waddell [28] notes the *absolute* predominance of sweet potato and Brookfield [29] writes: "This single-crop agriculture is comparable with the absolute dependence on *rice*, in all environments, of the Southern Chinese; but is sharply different from the multi-crop farming of the highlanders of, say, northern Luzon, the East African uplands, and the equatorial Andes."

"The dependence of this single crop is so marked in most parts of the Highlands that population in a given area becomes almost a direct function of the suitability of growing sweet potatoes," [30] and Waddell [31]

[20] Watson (1965).
[21] Howlett (1967).
[22] Howlett (1967).
[23] Watson (1965).
[24] Watson (1965).
[25] Howlett (1967).
[26] Howlett (1967).
[27] Watson (1965).
[28] Waddell (1972).
[29] Brookfield (1964).
[30] Watson (1965).
[31] Waddell (1972).

continues that as population decreases outward from "core areas" it is paralleled by a ". . . reduction in intensity of cultivation, and an increase in subsidiary economic activities such as hunting and fishing." Howlett[32] believes that higher population densities are allowed because of more intensive techniques and greater food yields per arable acre.

Ninety percent of the diet of *all* Highlanders is composed of sweet potatoes.[33] Although the amount is variable, there are approximately 123 calories per 100 grams of raw sweet potato and this tuber provides 85 percent of the caloric intake in some areas of the Highlands.[34] The tuber is also important for its protein content. It is baked, steamed in leaves, and made into a broth to be eaten with other vegetables. The leaves are seldom eaten.

The actual number of varieties of sweet potato grown in the Hignlands is unknown. "'Highlanders classify sweet potatoes on the basis of *leaf* form, or alternatively on the shape, color and consistency of the tuber." [35] Most names are peculiar to one language.

Controlled fire use in the Eastern uplands has been prohibited for twenty years to regenerate deforested areas. What effect this will have on upland agriculture is not immediately discernible. At any rate, after initial clearing (evidently slash-type), fences are built to keep out pigs. Sometimes collective fences are built (for example among the Chimbu and Wahgi Valley peoples) and each man's plot is distinguished by clumps of bamboo, rows of cordylines, casuarinas, or some ornamental plants. Both fallow and planted plots are often in one common fence.

Howlett [36] describes fence building when plots are near forested areas:

> ". . . stakes, pointed at both ends, are fashioned, much as are the planks for the wooden houses, thrusts into the ground and lashed together with vines. When the buried end rots and the vine weakens, the fence posts are reversed and bound with new vine."

He continues that in grassy valleys cane grass fences ". . . reveal considerable ingenuity of construction," and ". . . it is the life of the *fence* rather than weed growth as in the lowlands, which often determines the length of time for which a garden is cultivated."

In the lowlands fences are sometimes employed but there is not a heavy dependency upon them. Why is so much labor input required in fence building and mending in the Highlands? As indicated earlier, these fences are built largely to keep out pigs and there is evidence of a significant positive correlation between pig population and sweet potato cultivation. This correlation parallels the same findings in human populations.

The Bulmers [37] report that on European contact there were three non-indigenous domestic animals: the pig (*Sus scrofo*), dog (*Canis familiaris*), and fowl (*Gallus gallus*). While the pig was probably wild (and feral) in all substantial forest areas below 5,500 ft., and possibly

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[32] Howlett (1967).
[33] Brookfield (1964), and Howlett (1967).
[34] *Encyclopaedia of Papua and New Guinea* (1972).
[35] Brookfield (1964).
[36] Howlett (1967).
[37] Bulmer, Susan and Ralph (1964).

at higher elevations, the Bulmers (who are Anthropologists) report that the pig was ". . . apparently *not* found in the earliest pre-neolithic levels excavated." Taro is less preferred by both wild and domestic pigs and today sweet potato is their principal food. Watson [38] asks a very interesting question: "if stall-fed, what fodder was used for pre-Ipomoean pigs?"

". . . It is reasonable to suggest that pre-Ipomoean Highlanders relied on pigs, as well as gardens, much less continuously or regularly than do the present people," writes Watson,[39] and he sees pig-raising as one "index of sedentarism." Perhaps wild pigs followed sweet potatoes into the Highlands (if one can assume that pigs' preference for sweet potatoes has been relatively stable over time) in substantial numbers and were, over time, domesticated by the Highlanders. It is also possible that with increased food supplies after sweet potato introduction the Highlanders sought out the pig at lower elevations and assimilated the animal more completely into their lifestyles.

It is extremely difficult to store sweet potatoes in New Guinea. Brookfield[40] suggests that pigs could possibly be used for trade purposes if drought hurt a potato harvest and, in fact, the Korofeigu occasionally use salt (which they manufacture or process) and pigs for trade.

While many questions remain unanswered about the Highlanders' use of the pig, this aspect of their agriculture is another reflection of the impact of the *Ipomoea batatas* upon the Highland agriculture of New Guinea.

Soils in the Highlands are often clay or have heavy clay content and intense labor inputs are required to prepare the soil for cultivation. Internal garden designs vary from East to West, but sweet potato is the staple crop throughout the Highlands. All gardens are subdivided into a bed system on which mounds for sweet potato plants are prepared. Beds are separated by ditches or channels for drainage.

In the western valleys beds are usually ten to twelve feet square and the mounds several feet across while ditches are several feet deep. In the drier east, however, beds are long and narrow, the mounds smaller, and ditches only a few inches deep. In the east, ditches are used for walking between the beds as well as for drainage.

"The mounds of earth on the beds are not prepared in parallel rows but are staggered so that run-off is checked and thus less soil is lost." [41] Sweet potato must be well-drained so slopes often have downhill ditches for rapid run-off of excess water. Log barriers, saplings, and sometimes limestone rubble are used to prevent soil loss and in West Irian and the Chuave district "subsoiling" is practiced. In this method, washed-off soils are returned to the tops of beds and square beds separated by ditches are employed.

Altitude affects mound preparation and maturation time. Salisbury [42] observed one complete cycle of fallow and cultivation in the Highlands and noted that changes over time are relatively small and

[38] Watson (1965).
[39] Watson (1965).
[40] Brookfield (1964).
[41] Howlett (1967).
[42] Salisbury (1964).

not obvious. However, changes across elevations are quite pronounced. In the Western Highlands (around Wabag) dense populations are supported at 7,000 to 9,000 ft. by preparing large mounds ten to twelve feet in diameter and three to four feet high.

> "These are filled with weeds and old sweet potato vines over a period of weeks before the new crop is planted, so that they are in effect compost heaps. This practice not only improves soil fertility but apparently increases soil temperatures at these higher altitudes so that the crop matures more quickly."[43]

Generally the plant is propagated by means of leafy shoots. It matures in four to eighteen months. Brookfield[44] qualifies this maturation time: "On good soils at 5,000 to 6,000 ft. tubers mature in from three to five months after planting, but above 7,000 ft. they take eight to twelve months to mature and continue to bear for only three to four months." Only a few tubers are removed at a time and each plant is allowed to bear as long as possible.

"Sweet potato grows over a tremendous altitudinal range, from sea level to over 9,000 ft. and in a variety of climatic conditions."[45] The Bulmers[46] believe that it is between 3,500 ft. and 9,000 ft. that sweet potato is the most important crop throughout the Highlands. While sweet potato has a wide tolerance range, the plants are sensitive to wet soil, drought and especially frost.

Planting occurs in all seasons but in the drier East agricultural activity is concentrated during the period from November until the "wet season" (which is variable). Fallowing varies: at 5,500 ft. the land may be fallowed after two to three years while at 6,500 ft. it may not be fallowed for seven to eight years. Fallow time also varies. Potatoes can be stored with care, but, as indicated above, they are usually *not* stored in the Highlands.

Howlett[47] divides secondary or subsidiary crops into two major groups: those consumed regularly and those not regularly consumed. Those consumed regularly include: sugar cane, bananas, maize, cassava, and beans; while taro, yams and "indigenous foods" (such as the Highland *pitpit* — *Setaria palmifolia*) fall into the latter group. In the East maize and cassava are planted in case the sweet potato fails. Supplementary crops grow only to about 6,500 ft. and above this altitude nut-bearing trees supplement the diet.

This examination of the impact of the sweet potato on Highland agriculture leads one logically to ask: Where did the *Ipomoea batatas* originate? How was the crop transmitted to New Guinea, and how long have the Highlanders used and depended upon the crop? Like many other questions raised in this paper all these questions cannot be answered definitively. However, an investigation of the origins of the *Ipomoea batatas* has proven quite interesting and some suggestions are offered on possible origins.

Watson[48] lists several pre-Ipomoean crops such as the root crops taro and *Puevaria lobata* some form of yam, and sugar cane, bananas,

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[43] Howlett (1967).
[44] Brookfield (1964).
[45] Howlett (1967).
[46] Bulmer, Susan and Ralph (1964).
[47] Howlett (1967).
[48] Watson (1965).

perhaps winged beans and probably trees like nut pandanus. The Bulmers[49] suggest that bananas may have been transmitted *via* Malaysia, the Solomon Islands, or perhaps the *Australimusa* originated in New Guinea. They believe that yams and taro originated in Southern or Southeast Asia and propose that the sweet potato is American and probably introduced by the Spanish and Portuguese.

"Evidence of the recent introduction of the sweet potato to New Guinea is growing, and there is reason to believe that it antedates the dense population and intensive horticulture of the area."[50] Waddell[51] believes that ". . . this staple tuber only reached the area about 300 years ago, following its introduction to the Southwest Pacific by Europeans in the 16th century."

Watson[52] cites "ethnological facts" suggesting the recency of the sweet potato. The sweet potato, he points out, is *not* a focus for ritual, magic, or folklore like taro, bananas, sugar cane or yams. He also quotes L.J. Brass "a plant ecologist with the experience of seven New Guinea expeditions, (who) believes there is little doubt that the sweet potato reached New Guinea from the West, through bird-of-paradise hunters, traders, and other Malays."

Conklin[53] examines not only ethnographical and historical evidence but also lexical and "ethnoecological" evidence. He examines the possibility of *Ipomoea batatas* pre-Columbian travels from Africa to Oceania. He notes that the tuber is a dry-field crop of wide latitudinal range and that it was pre-Columbian in the New World in Mexico, Central and South America as well as the West Indies. *Batata* and *Camotli* are pre-Columbian names for sweet potato in Haiti and Central Mexico, respectively.

While sweet potato does not store well in New Guinea, Conklin believes that it would keep fairly well (like yams and white potatoes) for long voyages and thus could possibly be transmitted great distances. He notes that ". . . the normal increase in hydrocyanic acid in stale manioc roots meant only prepared meal (farinha) could be used on long voyages." If the sweet potato was not processed before shipment, then it is conceivable that some of the tubers would be left after the voyage for planting. Conklin concludes:

> "In sum, the evidence examined lends no support whatsoever to . . . the African-Oceanian hypotheses. Instead, it strongly suggests that late 15th-16th century Portuguese ships were the first to carry sweet potatoes to Africa, Goa, and parts of Indonesia from the Atlantic Coastal regions of mid-latitude America and that 16th century Spanish vessels sailing from the Pacific Coast of Mexico first introduced sweet potato to western Pacific regions including Micronesia, as well as the Philippines and other parts of Malaysia."

As an aside, Ho[54] has written an interesting article on the introduction of several American food plants into China. He reports that

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[49] Bulmer, Susan and Ralph (1964).
[50] Watson (1965).
[51] Waddell (1972).
[52] Watson (1965).
[53] Conklin (1963).
[54] Ho (1955).

the sweet potato was introduced "decades" before 1594. One theory he offers of this introduction is that a native, Ch'ên Chên-lung, an overseas merchant to the Philippines, brought the tuber to China from there. His son Ch'ên Ching-lun, presented the sweet potato to the Governor of Fukien in 1594.

Nishiyama[55] has studied possible Mexican origins of the *Ipomoea batatas*, (Fig. II). While he realizes that there are other hypotheses (tropical American, Asia-Africa, and Asia) on the plant's origin, he believes that it is American and possibly descended from *Ipomoea fastigiata*. Those who claim Asia as the plant's origin say it comes from *Ipomoea mammosa* which is cultivated some in Southeast Asia. Nishiyama has used comparative morphology as well as cytological studies in his search for *Ipomoea batatas*' origins and writes:

> ". . . chromosome doubling in a proto-type of *Ipomoea trifida* may have occurred in tropical America and produced *Ipomoea trifida* itself. Then a domesticated type was distributed over the world because of its importance as a food plant, this being the sweet potato (*Ipomoea batatas*)."

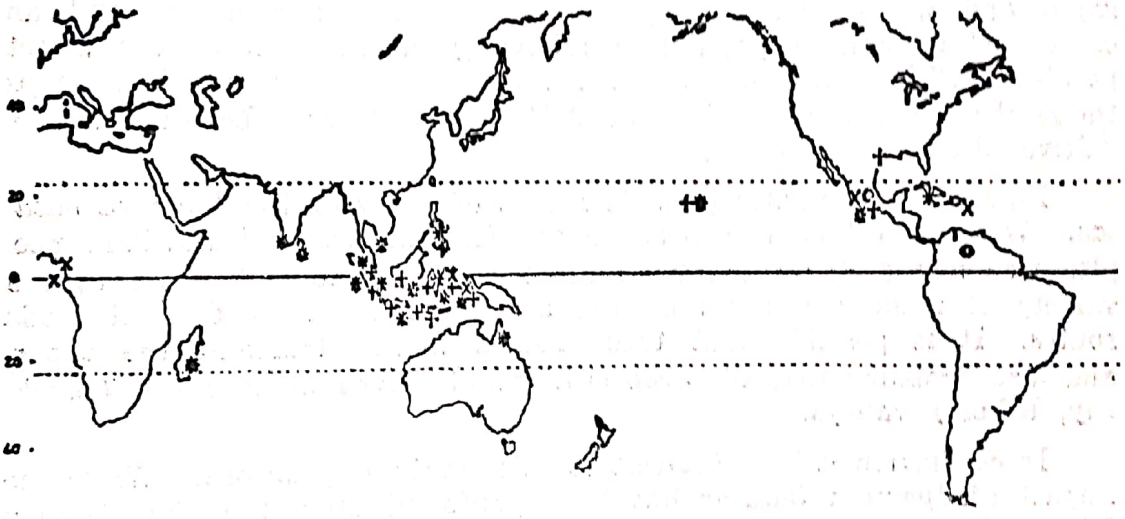

FIGURE II — GEOGRAPHICAL DISTRIBUTION OF *IPOMOEA* SPECIES IN SECTION BATATAS (HALLIER, 1893, 1894; VAN OOSTROOM. 1940, 1953; TING AND OTHERS, 1957; NISHIYAMA AND OTHERS, 1961). • = *I. TRIFIDA*; + = *I. TRILOBA*; × = *I. TILIACEA*; * = *I. GRACILIS*.

Source:

Nishiyama, Ichizo. "The Origin of The Sweet Potato Plant," in Barrau, Jacques. *Plants And The Migrations of Pacific Peoples A Symposium*. Tenth Pacific Science Congress, Honolulu, Hawaii, 1961. Bishop Museum Press, 1963.

[55] Nishiyama (1963).

Yen[56] points out, however, that "the progenitors of *Ipomoea batatas* have *not* been found so far," and he calls for more "phylogenetic study of *Ipomoea* from a cytological" approach. Yen has studied flower and leaf morphology as well as stem and root characteristics and writes that "the study in variation in the sweet potato indicates that throughout the regions of its cultivation it is in a *single* species." He concurs with Nishiyama and Conklin that the plant *probably* has American origins.

". . . In *all* of its distribution the plant is in a similar stage of evolution," Yen writes. He rules out multiple geographic origins, and suggests that *Ipomoea batatas* may have been introduced in three different areas in the Pacific: New Guinea, Asia, and the Pacific islands. ". . . It is obvious," he continues, "that secondary centers of variability may be proposed in the Pacific in such diverse areas as Hawaii, Easter Island, New Zealand, New Guinea, and the Philippines and that these correspond to the important centers of cultivation of the plant."

It seems evident that *Ipomoea batatas* is probably of American origins and that its introduction to the Central Highlands of New Guinea is fairly recent (perhaps no older than 300 years). How did the tuber reach the Highlands after its initial introduction to the Island? Brookfield[57] suggests a rather slow process of assimilation much as Geertz[58] describes in Java while Watson[59] believes there was ". . . a rapid and widespread development of intensive agriculture and an explosive" growth of population following introduction of the sweet potato. . ." Watson continues ". . . that the sweet potato is perhaps the *first* plant, general in the central Highlands, to have been *intensively* cultivated as a garden crop."

Figure III illustrates possible routes of entry of the *Ipomoea batatas*. While direct contact between the Highlanders and Lowland peoples was negligible in the pre-contact period, Waddell[60] notes that a variety of trade goods did diffuse along a number of distinct trade routes. It is possible that these routes helped transmit the tuber, and also probable that the crop cultivation moved along river (Sepik, Fly, Kikori) valleys.

In conclusion it is of interest to raise further questions. While the impact of *Ipomoea batatas* has been profound upon the New Guinea Highlanders' socio-economic infrastructure, what does the future hold? One question what the impact will be when the Highlanders adopt new technological-medical techniques. Will the death-rate decline markedly while the birth rate remains high? What is the carrying capacity of the land? How large a population can the land support? Since the sweet potato only reached the Island about 300 years ago it is conceivable that the population increase which is positively correlated with high sweet potato yields has not peaked. And with the non-indigenous population of the Island growing how long will it be before the Highlanders adopt new techniques to achieve higher yields or to make storage

[56] Yen (1963).
[57] Brookfield (1964).
[58] Geertz (1963).
[59] Watson (1965).
[60] Waddell (1972).

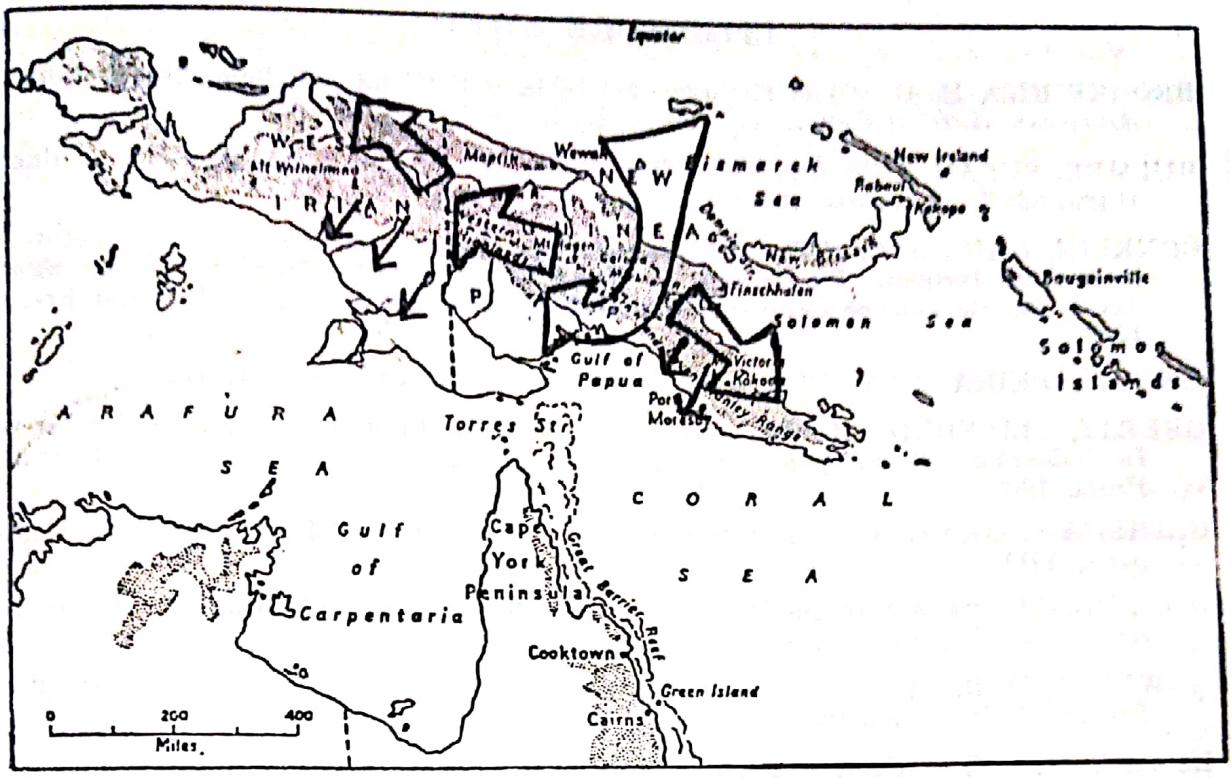

FIGURE III — ROUTES OF ENTRY OF THE *IPOMOEA BATATAS*

possible. If this is done, what will the effect upon the population be and what, in turn, will be the result of increased population upon the land?

The impact of the *Ipomoea batatas* upon the New Guinea Highlands has been an especially interesting topic of research. While all of the questions have not been answered, perhaps this is best because the impact itself goes uncompleted. Like life itself in New Guinea the impact is an on-going process.

Source:

Nolan, Cynthia. *Paradise, and Yet.* London: Macmillan & Co., Ltd., 1971.

Superimposed Arrows:

Ideas came from intensive study of available resources, but particularly from these sources:

1. Information provided by Watson, J. R. "From Hunting to Horticulture in the New Guinea Highlands." *Ethnology*, Vol. 4, 1965, 301.
2. "Territory of Papua and New Guinea." Map #9202. Produced by the Division of Natural Mapping, Department of National Development, Canberra, A. C. T. Printed by Authority of the Minister for National Development, 1970. #NMP /65/ 138.
3. *National Geographic Atlas of the World.* Vosburg Frederick G., Editor. Washington, D.C.: National Geographic Society, 1970.

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EARLY HORSE TRAFFIC AND THE PHILIPPINE ISLANDS[1]

by

MARY ELIZABETH MCCUTCHEON[2]

THE SETTLING

Spanish dominance of the New World gradually extended westward to exploit the lucrative spice trade of the East. It reached as far as the Philippines with the establishment of Cebu City, the first port settlement to connect China and Spain via New Spain (Mexico).

Spanish ships were prohibited from sailing from Spain by the easterly route around Africa to the Philippines. Philip II, king of Spain from 1556-1598, in order to realize the conquest of the Philippines, had to direct his traffics across the Atlantic and then the Pacific. In this manner, he avoided the famous Papal Bull or Line of Demarcation, which declared all new territory west of a line cutting through Brazil Spanish and east of the line Portuguese. Had Spain, in fact, sailed eastward, she would have committed an act of aggression. The Philippines was incorporated into the government of New Spain, for it was via New Spain that governing came.

HORSES

In a study of Spanish conquests elsewhere, the first thing to note is the horses which were brought with the Spanish whenever new lands were occupied or discovered. Hernando Cortez, Francisco Pizarro and many others all brought stock with them. Horses were a part of the Spanish cultural and military make-up. The Philippines, however, was horseless. The first Spanish adventurers sailed from New Spain across the South Pacific, pausing only at small islands to replenish stores. They considered themselves fortunate to arrive at their destination alive, much less carrying a stock of horses and cattle with them. There were several sources from which they could acquire horses, however; and the Spanish took advantage of them.

MANILA

In 1571, the Spanish took over Moslem-controlled Manila, which boasted a harbor more easily defendible than the one at Cebu City. Malayan and Chinese pirates were constantly a threat, as later those of England and Holland were.

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After the natives of Luzon were subdued, trade began with Manilan activities resembling those of a transhipment port rather than a real colony. Cargo delivered by Chinese junks consisted of such items as silks, brocaded furniture, pearls, gems, fruits, nuts, tame buffalo, geese, horses, and mules.[3] Portuguese ships annually left Manila in March to return from China by June to avoid the heavy monsoons. One may assume they carried similar cargos, shipped from Macao or Canton. From October to March, ships from Nagasaki arrived in Manila: however, the Japanese trade was never a stable commerce. One finds things such as silk, art, weapons, and wheat being shipped to the Philippines with several Chinese goods as well as Castillian wine being exported to Japan.

Siamese and Cambodian trading ships were even less frequent. Siamese trade was regulated by royal orders. Cambodia once sent a horse as a gift to the Governor of the Philippines, Gomez Perez Dasmariñas; however, this horse was returned with a note of political significance declaring Spain's neutrality in Southeast Asian affairs.[4] This does display the possibility of horses being imported from Southeast Asia, however.

THE HORSE TRADE

The Spanish imported the majority of the Philippine's horses from mainland China, with the remainder arriving from Japan and Timor Island. Only a few horses were imported from the Kingdom of New Spain. Asses and mules were very rare in the Philippines, though some were brought from China. Spanish nobility and get-rich-quick profiteers found no status in laboring donkeys, long the tools of peasants in Spain.

The Chinese horses survived and propagated, while those from New Spain appear to have done poorly. Wernstedt and Spencer speak of the repeated reintroduction of Asian horses into the Philippines, however; so all horses made a difficult start in this land.[5] But horses were a vital part of the Spanish military machine, both for transportation and cavalry. The Spanish were the most successful of Europeans to plant horses in this region, until the Americans intruded with the Spanish American War.[6]

On Luzon, Antonio de Morga tells how estates were being stocked with horses. Most horses born on this island were cross-breeds of Spanish and Chinese bloods. They "turn(ed) out well and of good

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[3] David P. Barrows, *History of the Philippines*, revised edition, (Chicago: World Book Co., 1926), p. 168. Also see Alvar Ward Carlson, "A Geographical Inquiry: Sixteenth Century Cebu City," *Philippine Geographical Journal*, Philippine Geographical Society, vol. 12, (July-December 1968), p. 45.

[4] Antonio de Morga, *Sucesos de las islas philipinas: dirigidos a Don Christoval Gomez de Sandoval y Rojas, Duque de Sea, 1609, Mexico*, translated by Henry E. J. Stanley and published as *The Philippine Islands, Moluccas, Siam, Cambodia, Japan, and China at the Close of the Sixteenth Century*, Hakluyt Society (New York: Burt Franklin, 1867) p. 34.

[5] Frederick L. Wernstedt and J. E. Spencer, *The Philippine Island World: a Physical, Cultural, and Regional Geography* (Berkeley: University of California Press, 1967) pp. 126, 211.

[6] Walker D. Wyman, *The Wild Horse of the West*, third printing (Caldwell, Idaho: Caxton Printers Ltd., 1946), p. 122. The U. S. Government purchased American horses of Morgan, Arabian and Saddlehorse breeding and shipped them to the Philippines. Native stock was considered too small for military use.

colors, well-conditioned, and willing to work, and of middling height."[7] Yet one gathers from accounts regarding these Asian imports that the Spanish had no love for them. The animals were broken in a different manner and accustomed to a style of riding the reverse of the European method.

Feed does not seem to have been a problem. De Morga stated the daily feed of horses was a green provender, a maize-like, long-leafed plant, good when green. Natural hazards such as predators (crocodiles reputed to eat both man and horse in one meal) existed and took their tolls. Father Domingo Fernandez Navarrette spoke in 1653 of pastures around Lake Bai where "They carry the great Cattel to feed; the Horses and Cattel graze, and even though they are watched, yet every now and then an Alligator comes out and carries away one of them as a Cat does a Mouse."[8]

THE POLITICAL SIDE OF THE HORSE TRADE

Certain political considerations entered into horse importations into the Philippines. Each nation had its own influence on what arrived when in Manila.

Spain.—The Spanish did not establish any sort of trading region until after 1571. Yet, as mentioned, even in the mid-70's, the Islands were being harrassed by privateers, among these was Limahong, a notorious, Chinese corsair. The Viceroy of New Spain was even forced to delay an embassy being sent to China — despite the worthwhile motives of promoting Catholicism and trade.

Portugal.—In the 1500's, the Portuguese had, by force and tenacity, established a chain of ports stretching from the Red Sea to Macao. These included Ormuz (near the head of the Persian Gulf), Goa, Malacca, and stations along the eastern coast of Africa. Earlier, a trade had thrived under Arabian and Indian guidance on the Indian Ocean. The Portuguese took control of this network by using local, political upheavals to their own advantage. The result was a powerful, Portuguese monopoly west of Malacca. Most take-overs were by force, for Indian Ocean traders were seldom armed. East of the Malacca Straits, however, it was a different story. Conflict with armed Chinese junks led to an uneasy truce; Portugal was forced to bide its time, hoping that Chinese hostilities would fade.

Portugal held the upper hand until 1600, making it nearly impossible for Spanish bottoms to operate. In 1594, King Philip II (I), joint monarch of both countries, prohibited any direct trade between Spain and the Philippines, New Spain, and China. The Eight Articles of Peace between Spain and Portugal granted the latter the exclusive, European right to trade with all ports of the Portuguese dominion as well as free trade with Spain, Peru, and Manila. All this political conniving was an attempt to hold the two countries beneath one crown. Yet despite a common ruler in Europe, the Spanish and Portuguese increasingly squabbled in the East Indies.

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[7] De Morga, *op. cit.*, footnote 4, p. 276.

[8] Father Domingo Fernandez Navarrete, "An Account of the Empire of China: Historical, Political, Moral and Religious," *The Travels and Controversies of Friar Domingo Navarrete, 1618-1686*, Edited by J. S. Cummins, Vol. II, (Cambridge: Cambridge Univ. Press, 1962) p. 65.

Macao.—The Portuguese maintained their European monopoly of the East Asian trade through their ports of Macao and Malacca. Upon Philip's (II) claiming of the Portuguese throne, Macao set up a senate-type government, trying to retard any Spanish intervention. The Chinese created a mandarinate here, quasi-recognition of the previously ignored "colony." The rise of Macao meant less trade for Canton and less risk of foreign involvement in China. Philip's policies favoring Portuguese shipping have been mentioned; he sought to hold his Empire together by allowing the Portuguese power in return for recognition of his claim. Notably, the granted power was a long way from Madrid.

As Portugal controlled a large network of shipping, she provided a direct transportation link with Europe. It was in Philips' interests to maintain the Portuguese as allies, for they controlled the oceans.

Macao was strongest from 1582 to about 1600. Chinese policy favored Portuguese traders with a duty only two-thirds that levied on the merchandise of others.[9] The Spanish charged a three percent tax on merchandise brought into Manila from China by Sangley (i.e., Chinese) traders, so also favored Portuguese bottoms.

Two events led to Macao's decline. One was the rise of Spanish shipping as Portugal's exclusive "grant" was ignored. The other was the intrusion of the Dutch.

The Dutch.—Dutch invasion of the East Indies was a result of a political move by Philip III (II) of Spain (Portugal); an adamant Catholic, he fancied himself the bulwark of the Church. He therefore excluded the Lutheran heretics from Lisbon, main port for oriental goods in Europe. This gave the Dutch the excuse they sought to precipitate their own ventures in the East Indies.

The Dutch were forever a thorn in the side of the Spanish. Their military might become a great danger. The Dutch policy was "to gain possessions which would give them the economic resources to wage war" in Europe (the Eighty Years War). Because the Portuguese settlements were more vulnerable than Spanish continental viceroyalties (New Spain and Peru), they received the brunt of the Dutch assaults.[10]

The conflict between Dutch and Iberian sea powers was complicated by Portuguese-Spanish animosities. The Spanish strove to rid the Moluccas (Spice Islands) of the Dutch once and for all. Don Juan de Silva, Governor of the Philippines, 1609-1616, was commanded by Philip III (II of Portugal) that:

> ". . . a force of Manila and Goa should rendezvous at Malacca and that the Governor and Viceroy (of Goa) should go abroad in Person, in order to fall upon Jacatra (Djakarta) and drive the Dutch quite out of India (the Indies). The Governor . . . with five mighty ships (and it is well-known that one of these Manila ships can defeat five or six European ships) arrived at Malacca, where he waited for the Viceroy of Goa for two years!"[11]

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[9] T'ien Tse Chang, *Sino-Portuguese Trade from 1514 to 1644: Synthesis of Portuguese and Chinese Sources* (Leyden, Holland: E. J. Brill Ltd., 1969) p. 103.

[10] C. S. Boxer, *The Portuguese Seaborne Empire, 1415-1825,* (New York: Alfred A. Knopf, 1969), p. 108.

[11] Navarrete, op. cit., footnote 8, p. 264.

With the plan's failure, the Spanish lost control of their possessions south of the Philippines and faced the Chinese threat on Manila by sea.

The English.—The Portuguese erred further when the Viceroy of Goa allied himself with the English, the "enemy," in order to have a partner in the East Indian trade. He considered them the lesser of two evils when confronted with the Dutch. He considered the former easier to handle. Despite precautions, however, the English eluded their masters, and made bargains on the side with Chinese traders, underselling their benefactors and supplying items such as drugs at fifty percent the Portuguese price.[12]

The Chinese.—China was reputed to have a great number of horses.[13] In 1515, Giovanni da Empoli, a Portuguese observer, mentioned many horses and large carts among several possible items for trade.[14] The Chinese presented the best supply of horses; however, their cargos, shipped from Canton, were "sold by weight, both merchandise and provisions, and live and dead animals."[15] The profit yielded, for example, when shipping a horse, was less than an equal weight of mixed cargo of silk, porcelain, etc. One could ship a horse weighing five hundred pounds cheaper than one weighing six hundred pounds and still have a horse. Silk could be resold in New Spain or illegally in Peru, while a horse was sold outright in the Philippines. This suggests that the smaller animals were shipped to the Islands; for the Chinese merchants were profit-motivated.

The Chinese restricted their own traders in the late 1500's, regulating coastal travel in an attempt to smother piracy. Early in the 1520's, they closed Canton after several incidents with the Portuguese; and although it was reopened in 1530, the Portuguese remained excluded.

An era of illegal trading followed. Despite a penalty of death, Sangley (Chinese, mainly Fuchienese) traders continued their operations. Chinese restrictions on foreign trade only led to the corruption of local officials who were willing to balance bribes and profits with possible, fatal repercussions. Closing Canton had left a serious deficit in the province's budget.

Horses imported from China were "small, very sturdy, of long step, vicious, quarrelsome, and ill-conditioned," according to one Spanish source.[16] Another Spanish account calls the Chinese horses "good travellers," but does not praise their looks. One commends the Chinese "post horses in this country—little of bodie but swyfte of foote."[17]

An early embassy to China from the Philippines received several horses as gifts; these were taken back to the Philippines on Chinese junks, despite the Chinese captains wanting to return to the more glamorous business of hunting pirates. Chinese, as well as Japanese ships were compartmentalized with water-tight bulkheads. This made it easier for them to carry stock in contrast to Spanish ships which

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[12] Chang, *op. cit.*, footnote 9, pp. 132-33.

[13] Juan Gonzalez de Mendoza, *The History of the Great and Mighty Kingdom of China and the Situation Thereof*, translated by R. Parke, edited by Sir George T. Staunton, Bart., 2 volumes (London: Hakluyt Society, 1853), p. 285.

[14] Chang, *op. cit.*, footnote 9, p. 36.

[15] *Ibid.*, p. 37.

[16] De Morga, *loc. cit.*, footnote 4.

[17] Gonzalez de Mendoza, *op. cit.*, footnote 13. He called the horses good travellers, p. 91; the comment on post horses is from R. Willis, *Historye of Travaile in the West and East Indies, 1569-70*, on page iv by Parke.

carried horses above board. Nevertheless, one encounters the complaint of ships being pestered by horses.[18] Even on crafts more suited to carrying livestock, horses were not easy commodities to ship.

Japan.—Japan was a more suspicious trading partner. In 1597, the Japanese objected to the "priests from Europe. . . traversing the country accompanied by large bands of disorderly persons to the destruction of peace and good order," and felt that "they made no secret of their design to effect the conquest of the Country, as had been the case in the Philippines."[19] Japan was also a victim of an alleged plot brought to light by the Dutch, who sought trading connections in that empire; the plot involved a Portuguese plan to attack and conquer Japan. The Portuguese denied this, but Japan excluded all but the Dutch from her ports in that year. Remaining trade was severely regulated by Japanese merchants, who set their own prices on merchandise. Before politics had complicated the picture, trade with Japan had been simple. One observer noted in January, 1613, that the "charges in Japan are not so great: onlly a pressent for ye Emperour and a pressent for ye Kinge, and two or three other pressents for the Secretaris. Other coustoumes here by nonn."[20] In contrast, in 1674, Navarrete commented: "If once they get wind in those ports that such a thing as 'conquest' is being mentioned, they will not leave a European alive there."[21]

Even with the Line of Demarcation as outlined by the Pope, a perpetual argument arose concerning the jurisdiction of the Philippines and Japan. Boxer states that despite the union of the two Iberian crowns (1580), the "Government of Madrid accepted, by and large, the Portuguese contention that Japan was in the Portuguese sphere of influence, and a Macao not Manila monopoly."[22] Yet Father Navarrete (Spanish) declared in 1674 that "the Portuguese will not be convinced. . . that Japan falls within the limits assigned to the West Indies, which is beyond all dispute."[23] Geographically, which parts of East Asia were in the Eastern or Western hemisphere depended upon whose politic-economic policies were momentarily dominant.

William Adams, an Englishman shipwrecked off Japan, became a source of knowledge about European affairs for the Emperor before formal trade was attempted between Japan and England. He explained the dissensions and animosities between the English, and Portugal and Spain; and it is noted by Adams that the Emperor was happy to hear of them.[24] After exclusion of all but the Dutch from trade, the Governor General of the Philippines was shipwrecked off Japan. In later conversations with the Emperor, this official re-

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[18] *Ibid.*, p. 116.

[19] Thomas Randall, *Memorials of the Empire of Japon: in the XVI and XVII Centuries*, editor of "Letters of William Adams," Hakluyt Society, (New York: Burt Franklin, ?) p. xvi.

[20] *Ibid.*, p. 43; "Letter III of William Adams".

[21] Navarrete, *op. cit.*, footnote 8, p. 371. Controls exercised by Japan are explained in a book, M. PaskeSmith, *Western Barbarians in Japan and Formosa in Tokugawa Days, 1603-1868*, second edition (New York: Paragon Book Reprint Corp., 1968) Photo of Japanese pony, pp. 276-77 illustrates size and Mongolian type.

[22] Boxer, *op. cit.*, footnote 10, p. 64.

[23] Navarrete, *op. cit.*, footnote 8, p. 371.

[24] Randall, *op. cit.*, footnote 19, p. 25. From Letter I of William Adams: "He demanded also as conserning the warres between the Spaniard or Portingall and our countrey and the reason: the which I gave him to understand of all things which he was glad to heare, as it seemed to me."

quested, as a token of international friendship, that the Dutch not be permitted to reside in Japan. Thus, even Japan was drawn into the European community of intrigues.

The English view of Japanese horses was rather flattering: "Their horses are not tall, but of the size of our middling nags, short and well trust, small headed and very full of mettle, in my opinion farre excelling the Spanish iennet in pride and stomache." [25] Another English account saw the horses as "small but of good quality, some breeds being equal to the Persian in form and speed." [26]

The Italians and Portuguese had, in the first part of the sixteenth century, given the Japanese some Arabian horses; and the Tokugawa Shogons stepped up importation afterwards, buying several Persian stallions and mares which they distributed among their various pastures.[27] The Spanish opinion of Japanese imports, however, leads one to believe that the Japanese kept the best for themselves:

> Some horses of good colours are brought from Japan, well-shaped, of much mane (but with) large fetlocks, legbones, and front hoofs; that they seem like dray-horses, the heads rather large, hard in the mouth, slow runners, but of good step, spirited, and of much mettle.[28]

Comparisons of Japanese and Chinese uses of horses are strikingly similar. Both used horses militarily. Both arranged for stock for their visitors' use. Inns were built in both countries to accommodate travellers. In Japan inns let and sold horses; it was the custom of that country to change horses every league or so.[29] The road was marked by leagues so people who rented out horses could not overcharge their patrons (no more than three pence a league). In China (Peking), "Beasts of Carriage were ready, saddl'd, and bridl'd, to hire to those that (went) from place to place." With very easy terms, one could rent an ass, mule, or Calash (light carriage). "The owner went along to watch his Beast, to bring him back after the Patron was done with him." [30] Inns in China were built at measured distances.

The Japanese were more interested in breeding good horses. Imported Arab and Persian blood have been mentioned. Government pastures were regulated and the rules enforced.

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[25] Randall, *op. cit.*, footnote 19, p. 63. "Narrative of Captain Saris, English Commander of the Clove, 1613-- Journey to the Japanese Court." The letters of Spanish Jennet was reputed to be the noblest horse in the world. It was in high demand in Europe. See R. S. Summerhays, *The Observer's Book of Horse and Ponies*, revised edition, (London: Frederick Warne & Co., Ltd., 1958), p. 201-02.

[26] Randall, *op. cit.*, footnote 19, p. 119. Persian horses were considered a "breed" before Christ's time and were highly prized. They carried Persian and later Parthian soldiers to victories, excelling as war horses. Even as late as 1670, the Persians and Armenians had the best horses in the world: See Navarrete, *op. cit.*, footnote 8, p. 309; and Summershays, *op. cit.*, "Persian" section, footnote 25.

[27] Vivienne Kenrick, *Horses in Japan*, (London: J. A. Allen, 1964), p. 143. Also printed by Hokuseido Press, Japan. The Portuguese took control of the ancient trade route from the Gulf of Ormuz (Persian Gulf) — (Strait) to India to the Far East. Arabian ships, held together with ropes and wooden nails, were loaded up with cargo; it was then covered with hides and horses were loaded on top. Marco Polo observed ships of this type. These fine-blooded horses reached China very early. See J. C. Van Leur, *Indonesian Trade and Society: Essays in Asian Social and Economic History*, (The Hague: W. Van Hoeve Publishers Ltd., 1967) pp. 79, 11, 337, 381.

[28] De Morga, *op. cit.*, footnote 4, p. 276.

[29] Randall, *op. cit.*, footnote 19, pp. 63, 171. Also Gonzalez de Mendoza, *op. cit.*, footnote 13, vol. II, pp. 58, 106.

[30] Navarrete, *op. cit.*, footnote 8, 217.

Horses did not appear to be for "common use" in China either. While horses were found in India used for packing and traveling, in China mules and asses were prevalent. Most travellers apparently walked, as per Navarrete's observations in the 1670's: "We met swarms of people on the road; some on mules, others on asses, others in litters, and others in sedans." [31] The Emperor of China, on the other hand, kept six thousand horses in his stables; as well as twenty-four elephants.[32]

New Spain.—New Spain seems an unlikely source for horses for the Philippines, when regarding the expense of shipping goods for the Philippines to that country. The galleons voyaging to Manila usually carried silver, letters, soldiers, and passengers. The westward cargo in no way equalled the array of rich stores sent eastward to New Spain. If one had the funds to finance the shipment of horses to the Philippines, as some Manileños did; and the desire, whether cultural, military, or for social prestige: to own the highly reputed Spanish horses; there was available space on ships headed for Luzon.

There were merchants from New Spain in Manila who came over on one galleon and left on the next; these men arranged sales personally and thus eliminated the middleman. A merchant could amass larger profits by buying direct.[33] Later, agents were used who drew the boletas for shipping spaces. The New Spanish paid for their goods with Peruvian silver shipped in by galleons. This "currency" could send prices skyrocketing if Chinese spies discovered how much silver was brought in on a particular ship. It appears conceivable that while the New Spaniards were over in Manila to buy, they would be willing to sell whatever they could—in this case, horses. Dealings by New Spain's citizens were first regulated, then became illegal; but several years of trading intervened.

Considering the difficulty and expense of transporting horses from America to the Philippines, only the best quality horses were shipped; and good horses were available in Spanish America. While the West Indies had been raising "good horses" for some time, the Mainland was a more probable source. Several ranches in New Spain were reputed for raising fine horses, mares, and mules. In the Oaxaca Valley "some of the best horses in the Kingdom" were bred.[34] The District of Guatemala, in and around Chiapa, was declared to have "the best horses in all New Spain: they can compete with those of Cordova, and some assert that they can surpass them." [35] A similar type of horse, perhaps of better quality and blood, was also available through the Portuguese by an entirely different route. The Spanish Jennet, from which most New Spanish horses were descended, was larger than the Persian-Arab, Chinese, and Japanese varieties. It is probable the Spanish were seeking size through their imports.

The policy in Latin America had been one of establishing horse and cattle breeding farms in the West Indies: Hipañola, Jamaica, Puerto Rico, and Cuba. From there they supplied the conquistadores and colo-

[31] Navarrete, *op. cit.*, footnote 8, p. 212.
[32] *Ibid.*, p. 215.
[33] William L. Schurz, "Mexico, Peru, and the Manila Galleon," *Hispanic American Historical Review*, I (November 1918) 391.
[34] Antonio Vasquez de Espinosa, *Compendium and a Description of the West Indies*, translated by Charles U. Clark, Smithsonian Miscellaneous Collection, Vol. 102, (Baltimore: Lord Baltimore Press, Sept. 1, 1942) p. 179.
[35] *Ibid.*, p. 205.

nistas with animals. Breeding stock had been promised as an incentive for settlement in the New World. As a result, a great strain was put on Spain as the main source of stock. Perhaps the Spanish were following the same pattern in the Philippines.

Such a road network was available via El Camino Real and coastal routes that mules and horses could be readily shipped. In Spanish America, equines were used not only for travel, but also to power sugar mills. In later years, this demand for "sugar power" led to depletion of horses in the West Indies and resulted in importation from New England. However, sugar was not grown commercially until the late 1700's in the Philippines. Though the Spanish government limited trade to a trickle between New Spain and the Philippines, horse types of excellent reputation might have found the way to Acapulco for export.

Trade would be expected between Peru and the Philippines. Peru would actually have been a richer market for China, for Peru produced a great quantity of silver. However, royal edicts by Philip II prohibited Peruvian participation. Nonetheless, it was common knowledge that "from Viceroy to Archbishop, everyone trades, although secretly and by the agency of another." [36] Ships between Acapulco and Peru, "Lima Ships," were illegal but sailed.

Horse losses were great between Spain and America. Not only were the ships sent out ill-equipped, but horses were carried on the top deck in pens, and exposed to all types of weather and feed—the latter many times being rationed. Horses were loaded by pulley in Spain; in Hispañola the beach and tides were so treacherous that ships were anchored off-shore and horses (after a long period of inactivity) dumped to swim ashore. If a horse survived the rigors of disease and rat bites during the voyage, it had to content with sharks and rough seas before its actual arrival.[37] Losses were probably as great, if not greater, when traveling from Acapulco to Manila. This economic consideration was a main factor when buying most of the Philippine's stock from China and Japan.

Shipping goods by Manila galleon was further complicated by division of cargo space into piezas, divided in ratio to the Philippine's Spanish population. Each person received a share according to merits, deeds, and special grants. A pieza measured two and a half feet by two feet by ten inches. These boletas (tickets) were distributed to persons whether or not they had goods to ship or could afford such. It was legal, however, to auction off piezas to the highest bidder.[38] Obviously, a man shipping horses would need several. This suggests that New Spain horses were brought over only by the wealthiest and most influential persons.

Timor Island.—Timor Island horses were also imported to the Philippines. This area had been settled by the Portuguese in 1566, and held despite Dutch attempts to overrun it. The exportation of sandalwood, mainly to China, was the main economy.

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[36] Schurz, *op. cit.*, footnote 33. See pp. 395-401 for exact fluctuations in policy.

[37] Robert West Howard, *The Horse in America*, (Chicago: Follett Publishing Co., 1965), p. 20.

[38] H. de La Costa, *Readings in Philippine History: Selected Historical Texts* (Manila: Bookmark, 1965), p. 34.

There are several, original sources of horses for Timor. The present pony population there shows Arabian ancestry. That the Dutch and Portuguese imported horses into Indonesia is a fact; the Dutch established a stud at Minankabau, Sumatra, in later years. During the fifteenth century, when the Portuguese had control of the Ormuz-to-Vijayanaga (India) traffic of Arab horses, they shipped animals as far as their Indonesian possessions. The export of sandalwood to China suggests a return horse trade to Timor, if the Portuguese desired it. Thus the present Sandalwood Pony of Timor can be accounted for: a pony similar to the Chinese type previously described, but with a mixture of Arabian blood.[39] Importing Timor horses may have given the Philippine base stock more size. Mendoza hopefully added upon describing Chinese horses: "Their horses for the most part are little. . . yet they say within the country there are verie great and excellent good horses."[40]

POLITICAL MANEUVERING

Spanish intentions were not always as honorable as King Philip's decree dictated: "You shall make every effort to enter into and maintain friendly and peaceful relations with the natives."[41] William L. Schurz states that in Japan nothing more than a spiritual conquest was hoped for; the Spanish feared Japanese, maritime expansion. Philip feared loss of the Philippines; such a tragedy would have laid the coasts of America open '"to aggression from the west, and imperiled the route of the South Sea fleet from the Ports of Peru to Panama."[42] He allowed only a small volume of trade, fearing that other powers would establish trading settlements along American coasts, attracted by potential profits. The Galleon Trade was one of the world's best-kept secrets until the English uncovered its operations. Then open season on galleons was declared. The English burned what they could not carry away.

Schurz also states that several plans to conquer China were considered by the Spanish.[43] A perusal of sources reveals numerous "military comments" made by visitors to China. Juan Gonzalez de Mendoza reiterated the poor quality of the Chinese soldier, although he claimed there were 948,350 horsemen in all the kingdoms of China.[44] However, it was common knowledge that the Chinese could not handle their horses well at all; their equipment was poor and all in all, they were "verie ill horsemen." The English privateer, Thomas Candish (Cavendish) returned from one of his voyages carrying a map of China exhibiting a numerical breakdown of military strength. His total of horsemen in

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[39] Summerhays, *op. cit.*, footnote 25, p. 220. "Timor Island Pony" Also see pp. 8-12 Asia section mentions very early horse trade in East India. The exchange of horses was still active according to Navarrete, *op. cit.*, footnote 8, Vol. II, pp. 118. 306, 318.

[40] Gonzalez de Mendoza, *op. cit.*, footnote 13, p. 92.

[41] La Costa, *op. cit.*, footnote 38, p. 18.

[42] William L. Schurz, "The Spanish Lake," *Hispanic American Historical Review* V (May 1922) p. 187.

[43] *Ibid.*

[44] Gonzalez de Mendoza, *op. cit.*, footnote 13, p. 91. See H. Descond Martin. *The Rise of Chingis Khan and his Conquest of North China*, (New York: Octagon Books, 1971), "Mongolian Army" section. He claims the Mongols used the element of exaggeration to scare enemies into submission. People like Gonzalez de Mendoza and Thomas Cavendish did not take actual counts of soldiers.

the provinces of China was 454,528.[45] Regardless of the accuracy of such absolute numbers in either case, such military intelligence more realistically should be viewed in an offensive rather than defensive vein (despite later fears of Chinese sea attacks on Manila). It was not (at first) a fear of being attacked by China, but rather assessment of China's future defense capabilities which concerned European powers. It is easy to visualize a repetition of the West Indies pattern — establish horse breeding centers to augment the exploration and conquest of lands to the east; the difference being that the Asian lands had horses and an organized defense system. Had Spain not overextended herself to such an acute degree and suffered depletion of resources and manpower, the entire history of East Asia might have been remarkably different. Too many, more vital competitors entered the scene, however, before she could complete her imaginative plans.

THE HORSE IN THE PHILIPPINES

The horse never got the foothold in the Philippines that it did in the Americas. Manila's function was as an entrepot, not a colony. The Spanish did not go out and begin agricultural ventures or large settlements, for greater profits were to be made from trade. A Spaniard usually came to the Philippines, stayed a few years, made his fortune, and returned to New Spain or Spain—if his galleon did not sink or everyone aboard sicken and starve. The Philippines became an outpost of the Spanish Empire. Sugar, later an agricultural staple, was not grown commercially; it could be cheaply bought from China. The country was divided into large encomiendas; tribute was collected but "capital" was not reinvested into the land. Only later, after the English broke the Spanish power in the South Pacific, did forward-looking Spaniards seek to make domestic production a reality.

The role of the horse, therefore, was not in commercial agriculture; its main use was in the City. The carabao, or water buffalo, handled the heavy tasks that the horses and mules were assigned in the Americas. The equines only contributed to light work.

The horse was necessary in the City, but off the main thoroughfare roads did not exist. The early description by Father Diego Garcia vividly illustrates this point:

> The climate of this land is excessively hot and oppressive . . . travel is mostly by water . . . where one can go by land it must be on foot, because up to now there are no mounts to be had in the Viscayan Islands. And even if there were any, the roads are so steep that there is no going on horseback . . . where the ground is level, the mire is so deep, especially during the rainy season, that the horses would simply get stuck.[46]

A later account in the 1700's stated that a major obstacle to domestic improvement were the roads:

> There are no roads to speak of . . . the pack animals (Carabaos in this country) cannot carry much of a load . . .

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[45] Hakluyt, Richard, "Certaine Notes or References taken out of a Large Map of China, brought home by M. Thomas Candish, 1588," *The Principal Navigations, Voyages, Traffiques and Discoveries of the English Nation, made by sea or overland to the remote and farthest distant quarters of the Earth at any time within the compass of these 1600 years*, vol. 8 (London, Toronto: J. M. Dent & Sons Ltd., 1927), pp. 280-282. Also Martin, *op. cit.*, footnote 44.

[46] La Costa, *op. cit.*, footnote 38, p. 27.

and after a short time in the sun, refusing to go any farther, they wallow in the first mud-hole, river or creek they find.[47]

The horse was important militarily, as it had been in the New World. A demonstrative use of horse power was in the Native Revolt of 1660. Governor Manrique de Loa dispatched a cavalry squadron to cut off the main road which ran southward to Manila and so sealed off the revolt. The Hakluyt Society's Appendix II of Antonio de Morga's work counted four squadrons of cavalry as of 1867.[48]

MANILA

Manila evolved from a rural to urban community quickly. In 1606, twenty-four cattle ranches near Manila were owned by its citizens, loose stock frequently doing damage to adjoining farms. As of 1627, however, land around the City was becoming intensely cultivated; crops to supply the City's needs supplanted pastures. Urbanization had begun. Minor forage crops were being cultivated to feed local horse populations.

Manila was a city of sharp and sudden contrasts. Fuchien traders settled to carry on small businesses and lived frugally. The Spanish disliked this invasion, seeking a political motive in Chinese settlement. The Chinese were time and again harassed. On the other hand, the Spanish lived well. In 1624, a Jesuit newsletter spoke of gold stirrups coming into fashion; what could be more important to the Society of Manila?[49]

The horse was an integral part in the duplication of European culture in Manila. Carriages were the prestige item. If you were anyone (or thought you were), you would never be seen leaving your home except by carriage. The Governor's coach was drawn by six horses, and preceded by several men on horseback. The Attorney General, the King's Lieutenant, and the Bishop and Oidores were allowed to use four horses before their carriages. Private persons were limited to two. A pair of horses could be hired for twenty or thirty dollars a month, including keep; a driver for six or eight dollars.[50] The equipment was usually imported, mainly from Bengal and England; and from Batavia and the United States by the wealthiest Manileños. Nathaniel Bowditch, writing in 1796, criticized Europeans while pragmatically stating that his fellow Americans travelled by Shoe Leather. "All the English commanders here live in stile rowling about in their Coaches." He spoke of a Portuguese captain who kept his coach on shore, and of a Swedish ship master who "lives in stile, having coaches ten horses and twenty-odd servants.[51]

By the mid-1700's Manilan-made coaches were reputed to last more than a generation. These included coaches for daily use, for special occasions, jitneys for families, and the upper class barouches. The Eighteenth Century was the "Great Age of the Coach."[52] It was during

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[47] *Ibid.*, p. 111.

[48] De Morga, *op. cit.*, footnote 4, p. 387. Also see La Costa, *op. cit.*, footnote 38, pp. 56-60 for a more detailed account.

[49] La Costa, *op. cit.*, footnote 38, p. 59.

[50] *Ibid.*, p. 122.

[51] Nathaniel Bowditch, *Early American-Philippine Trade: the Journal of Nathaniel Bowditch in Manila, 1796*, edited with introduction by Thomas R. and Mary C. McHale, Southeast Asian Studies Monograph Series #2, (New Haven, Connecticut: Yale University Press, 1962), p. 45.

[52] Arthur Vernon, *The History and Romance of the Horse*, (New York: Dover Publications, 1946), p. 215.

this century that the stagecoach became important in Europe, and that a Frenchman started a factory in Manila producing "carretelas," which stole the less wealthy buyers' market. Local prices rose correspondingly, though essential parts and machineries still came from Europe. An American later advanced styling and improved marketing and manufacturing in Manila; these innovations abolished nearly all imports of carriages.

In 1790, the Spanish king opened the port of Manila to non-Asiatic shipping, while strictly regulating Asian imports. According to Bowditch, this decree was flagrantly violated; from 1794 on, Manila was open to all foreign goods, European, and Asiatic. The editors of this Journal told of Americans who left Salem, Massachusetts, with mixed cargoes from New England and the South, trading in the West Indies and the Baltic; and peddling the way around the Cape of Good Hope, by Mauritius, and into various ports of the East Indies. Bowditch also mentions the beginning of the sugar industry, whereby all their sugar was pressed in a "mill kept in motion (not by horses but) by a Bufaloe—all their weight (of sugar) being ground also by Bufaloe mills."[53]

Horses in the Philippines, therefore, were not used for heavy draft power; but rather for light transportation needs: carts, light deliveries, and passengers. These tasks fitted the character of the small, pony-size Philippines horses. Coach horses, however, were a heavier type and probably possessed more jennet blood. Horses were later employed for taxi-carts, until the motor replaced them.

HORSE EXPORT

The possibility has been raised of shipping horses by return galleon to New Spain. This was not done for several reasons. The Kingdom of New Spain had acquired horses directly from Spain (the difficulties of that journey have been discussed), and from the West Indies. Even as early as 1584, according to Gonzalez de Mendoza, there was an abundance of horses in Mexico, "very gallant and good." He states that the "brood of them was carried out of Spain thither, when first they did discover that country, and for that effect were chosen the best that could be found."[54] When the Philippines needed horses, the New Spanish already had them, and as discussed, owned a more preferable type.

The sheer danger of the return voyage from the Philippines would have discouraged any shipment even if the Chinese horses had been considered desirable. Several galleons were lost and, with each, fortunes. While various laws were passed to restrict the value of goods brought to Mexico, these were seldom adhered to. A ship returning from the Philippines could, if wisely loaded with a chosen cargo, bring in profits of six to eight hundred percent![55] In addition, a galleon was crammed to the masts with the pick of Manila's stores. Why ship a horse over such a distance even if feasible and necessary, when greater profits could be made from goods one did not have to feed and water?

Economics entered the picture of trade dramatically. The silver flow out of New Spain (and Peru) into China has been mentioned.

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[53] Bowditch, *op. cit.*, footnote 51, p. 59.

[54] Gonzalez de Mendoza, *op. cit.*, footnote 13, p. 220. This is disputed; some authorities hold that only second grade stock was shipped to the New World, although first rate prices were paid.

[55] Barrows, *op. cit.*, footnote 3, p. 149.

Ships which left Manila for New Spain had to pay a two-percent export duty upon leaving. If they arrived in Acapulco, forty ducats Castillian were due per ton of freight; there was also a ten-percent import duty and first sale tax imposed on arriving goods.[56] The fewer ships sailed and the less conspicuous these were, the better. The less other European powers knew about the Spanish, Pacific trade, the better. Spain did not have the armaments to police her "Spanish Lake."[57]

THE DECLINE OF SPANISH POWER

The ultimate decline of the Spanish in the Philippines was brought about, not only by English intrusion and Dutch meddling, but by a simple inability of Spain to control and protect her claims. She faced depopulation as her citizens sought richer lands. She shipped so many horses to her colonies that she experienced a serious depletion of stock. Spain was not able to maintain control of the Iberian Peninsula, much less enforce cedulas and royal edicts in the Americas and the Philippines. Her empire expanded too quickly to regulate growth. The Philippine's reorientation to domestic production is a stark example of Spain's loss of world power, of the decline of her imperialistic capabilities. On the other hand, in the Philippines an oversupply of horses was hinted by Governor José Basco y Vargas, who was considering the use of horses for skins and dried meat.[58] At this time, the farming hill people of Jolo in the Muslim south were riding about the Island armed, indicating further turmoil.

The Philippines could never keep her outposts of Tibore and Ternate well-supplied. Antonio Vasquez de Espinosa claimed that "goods kept arriving precariously and practically never got there!"[59] In the city of Manila, the loss of one galleon could send the entire economy into a panic. Competition between Philippine and Mexican buyers, the latter shipping in silver, sent prices up dramatically and destroyed the economic practicality of the Spanish monopoly. Portugal, main shippers from the Philippines eastward, was in even worse shape — overexpanded, undermanned, with several parts of her homeland suffering from worse exhaustion than Spain was experiencing. While Spain had been the vanguard of military progress, the whole of the sixteenth century in Europe, Portugal, for nearly two hundred years, wholly refrained from organizing any permanent military units.[60]

In conclusion, the Spanish were not true colonists here, despite planned military endeavors. Father Murillo Velarde summed up the Spanish occupation of the Philippines as follows:

> "The Spaniards have settled and populated America because of its productivity . . . those who migrate to these Islands are in an Inn: they do not look upon it as home . . . they come as transients.[61]"

Yet, the horses stayed.

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[56] De Morga, *op. cit.*, footnote 4, p. 343.

[57] Schurz, *op. cit.*, footnote 42. The terms stress the economic and political power Spain possessed over the vast Pacific.

[58] La Costa, *op. cit.*, footnote 38, p. 113.

[59] Vasquez de Espinosa, *op. cit.*, footnote 34, p. 275.

[60] Boxer, *op. cit.*, footnote 10, p. 117.

[61] La Costa, *op cit.*, footnote 38, p. 96.

* My special thanks to Dr. Alvar Carlson for planting the seed of thought to research this paper while he was teaching at Humboldt State University, Arcata, California. See footnote 3.

HISTORY OF IMPORTATION OF INDIAN BUFFALOES AT GOVERNMENT STOCK FARMS

by

VALENTE VILLEGAS[1]

The first government importation of Indian buffaloes consisted of 57 head in June, 1917. The second importation was in August, 1918. There were 85 head in this group. The U. P. College of Agriculture got its first stock of the breed from this shipment.

Since 1947, Indian buffaloes, mostly of the Murrah breed, had been imported into the Philippines. Other breeds which were brought here were the Kundhi and Nili Indian buffaloes.

On July 19, 1947, the shipment consisting of 7 males, 32 females and 11 young stock, arrived in Manila on the *SS Silverlight*. The Murrah buffalo carabull named *Manki* from this shipment went to the U. P. College of Agriculture. The same carrier made a second trip to bring 1 male, 16 females and 5 young stock which came on November 8, 1947. The third consignment had 3 males and 116 females and was loaded on the *SS Drente* which reached Manila on October 19, 1950. The fourth importation of 100 males came on the boat *Roebiah* on February

FIGURE I — U. P. COLLEGE OF AGRICULTURE'S SHARE OF INDIAN BUFFALOES IMPORTED ON MAY 2, 1955.
(*Courtesy, U. P. College of Agriculture*)

28, 1953. The fifth group of 4 males, 201 females and 118 young stock arrived on May 2, 1955 on the *M. V. Hoegh Silverware*. Twenty-two head from this consignment went to the U. P. College of Agriculture.

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The sixth batch had 18 males, 179 females and 33 young stock and were loaded on the *M. V. Bawean.* These animals arrived on June 30, 1955. Unfortunately, these animals caught rinderpest in India and reintroduced this awful scourge of carabaos and cattle in the Philippines. The veterinarians, however, true to their calling coupled with their experience in stamping rinderpest before, successfully stopped the disease within a few months. The last importation of 98 young females came on the *M.V. Wonosari* on January 30, 1956. In 1966, six Murrah carabulls were donated to the Bureau of Animal Industry by the Indian government. On August 4, 1967, 137 Murrahs arrived from India, 100 of which caraheifers, 30 carabulls and 7 caracalves. In the same shipment, 12 caraheifers, 1 carabull and 11 caracalves, all Murrahs, were consigned to Mr. R. Jorge.

FIGURE II — NELLOR CATTLE AT UBAY STOCK FARM
(Courtesy, Bureau of Animal Industry)

As of May, 1972 Murrah buffaloes are distributed in different government stock farms as follows: Bongabong Stock Farm, 94 head; Ubay Stock Farm, 7 head; and La Carlota Stock Farm, 1 head.

Approximately 1,000 head of Indian and Pakistani buffaloes have been imported into the Philippines since liberation for dairy purposes and for the production of big-sized strong work Indian-Philippine carabao crossbreeds. As mentioned above, most of the animals are of the Murrah breed. The Kundhi and the Nili breeds but in lesser number, have also been imported. Other Indian and Pakistani buffalo breeds are the Surti, Mehsana, Ravi, Nagpuri and Jaffarabadi.

Before World War II the government made two importations.

Murrah.—Most of the Indian buffaloes in the Philippines belong to this breed. The breed goes also by the name, Delhi buffalo. It is principally in Delhi, Rohtak, Karnal, Sind, and Gurgaon for the pro-

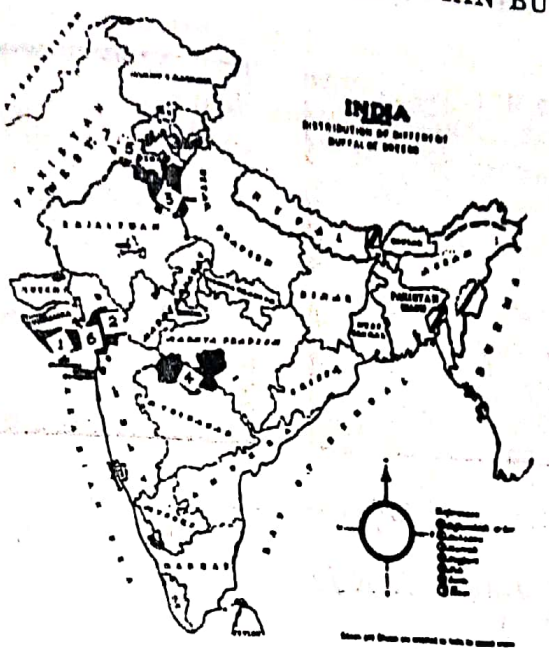

FIGURE III — NUMBERS ON SHADED AREAS ON MAP INDICATE ORIGINAL REGIONS WHERE SEVEN PRINCIPAL BREEDS OF INDIAN AND PAKISTAN BUFFALOES WERE DEVELOPED.

(Courtesy, Dr. David C. Rife, Esq.)

duction of milk and liquid butter called *ghee*. At the U.P. College of Agriculture the average weight of the males is 577 kilograms, that of the females 557 kilograms. The average height is 131 centimeters. The color is jet black but some are light brown, the switch often times white. The legs may also show white spots. The horns are curled inwardly. The barrel is wide and low, the ribs well-sprung. The hindquarters are very well developed below which is the large mammary gland with stout long teats. The points of the hips are prominent. In its native home, the average milk yield is 4,048 liters during an average lactation period of 281 days.

At the Aarey Milk Colony, India, one Murrah caracow had milk production record of 3,475.0 kilograms. At the Government Dairy Farm in Visakhapatnam there were 513 Murrah buffaloes. In 1951-1952, the average milk yield per lactation in this farm was 1,351.8 kilograms. In 1958, the average yield per caracow was 2,366.1 kilograms, the highest record in India and Pakistan. At the Tarai State Farm with 212 milking Murrah caracows in 1958, the improvement in milk production in 10 years was from 1,800 to 2,250 kilograms per lactation. The highest yield was with one caracow which produced 24.2 kilograms of milk a day.

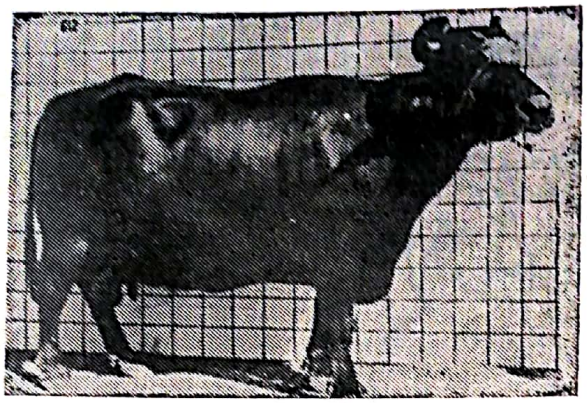

FIGURE IV — MURRAH CARA-COW.
(Courtesy, Dr. David C. Rife, Esq.)

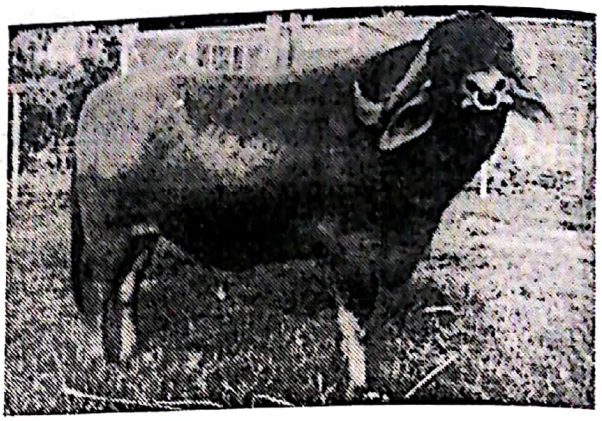

FIGURE V — SURTI CARABULL
(Courtesy, Dr. David C. Rife, Esq.)

Kundhi.—This is a strain of the Murrah buffalo which received its development along the Indus river and in northern Sind. It is black in color, some brown. The face is dished, the poll is a little prominent. The tips of the horns are coiled in the manner of fish hooks from which the name Kundhi was derived.

Nili.—The term Nili means blue. It was named after the blue waters of the Sutlej river passing the area where this breed of buffalo is found. The breed is also produced in the Pakpattan area of Montgomery and Ferezepore area of Punjab. It is medium-sized, considered one of the best in India. The Nili imported by the Philippine government on May 2, 1955 went to the Bureau of Prisons in which 82 head are kept at the Iwahig Penal Colony in August, 1972.

The breed is much like the Murrah buffaloes, the color being black, some brown. Animals with white on the head, legs, switch, and those with wall eyes are preferred. The head is long, the space between the eyes low and the forehead bulging. The horns are small and curved inward. The udder is well-developed. The average milk production in its native home is 1,590.9 kilograms in 250 days.

Surti.—Good specimens of the breed are raised in the Kaira district of Bombay and in Petland of Baroda State. It is black or brown. White markings are seen on the jaw, brisket and switch. The size is medium. The horns are flat, curved but not curled and medium long. The head is long, wide and the forehead prominent. The milk yield is on an average of 1,659.1 kilograms a lactation.

Ravi.—The Ravi buffalo bears also the name *Sandal Bar buffalo* after the Sandal Bar region in the Ravi river valley where it is raised. The color is black or brown. The udder and briskets may be pink in color. Wall eyes and white markings are favored. The appearance is much like the Murrah buffalo. The head is wide, flat at the top and deep at the lower jaw. The horns are big and very much coiled. Double chin characterizes the breed. It is a heavy milker, the average production being 1,818 kilograms in a lactation period of 250 days.

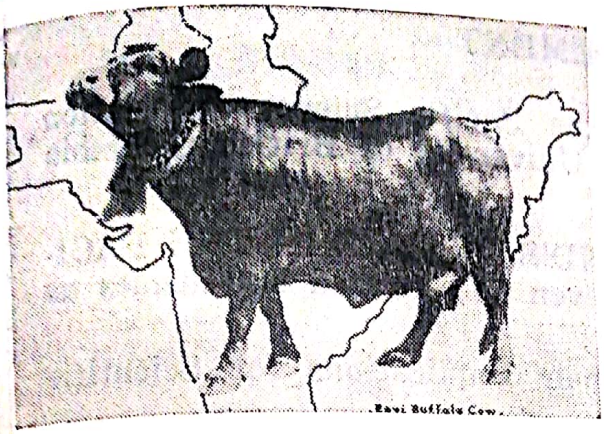

FIGURE VI — FEMALE RAVI BUFFALO.
(Courtesy, Dr. David C. Rife, International Cooperation Administration)

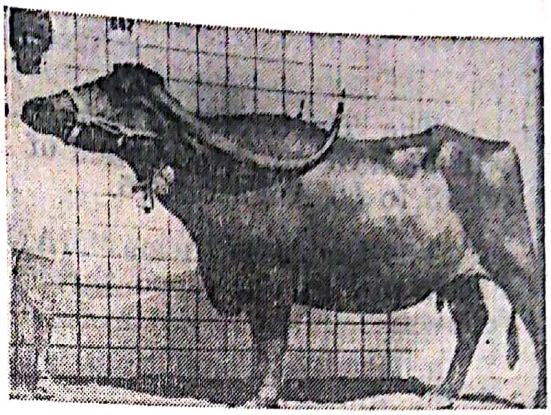

FIGURE VII — NAGPURI CARACOW
(Courtesy, Dr. David C. Rife, Esq.)

Nagpuri.—Known also as the *Ellichpuri buffalo,* its habitat is in central and Southern India. The color is black with white on the face, legs and switch in some individuals. The head is long and so is the neck. The face is straight. The body is light, and the legs are long. The horns are flat, curving and may reach the shoulders. The breed is used for work and for milking purposes but are not as productive as the other Indian breeds.

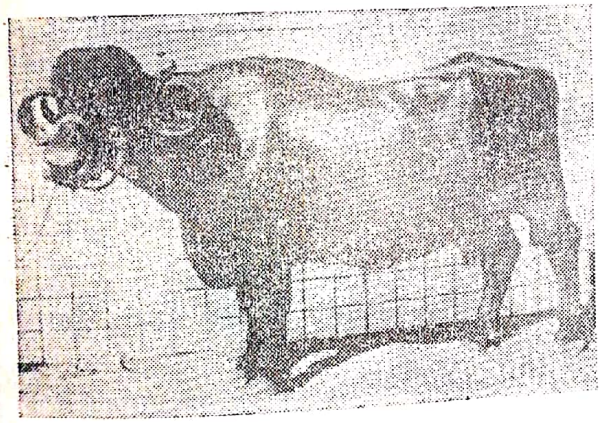

FIGURE VIII — JAFFARABADI CARACOW
(Courtesy, International Cooperation Administration, Washington, D.C.)

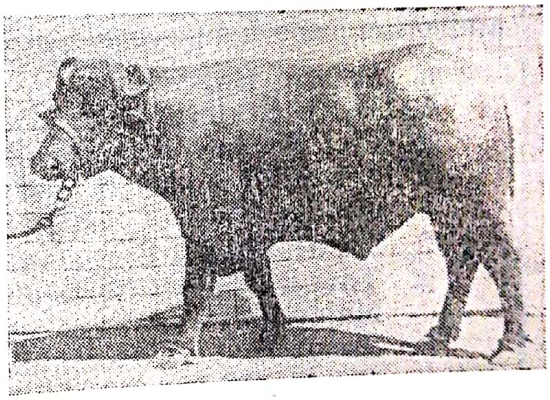

FIGURE IX — MERSANA CARABULL
(Courtesy, Dr. David C. Rife.)

Jaffarabadi.—This is a long and heavy-bodied Indian buffalo with big udder that gives large quantities of milk and butter fat. The color is black. The forehead is prominent. The horns are long-sized and are grown downward on the sides, the tips rising but not curled. The neck is thick with well-developed dewlap. The breed is raised in Gir in the Kathiawar area.

Mehsana.—A medium-sized breed, intermediate in body structure between the Murrah and Surti breeds, with horns similar to that of the Surti. The animals are black or fawn gray, sometimes with white face, legs, and switch. It has a big head, the legs are light and long. It is raised for milk and *ghee.* It is found in the Baroda State.

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