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## *Sahara Reclamation:*

### *A Garden and a Paradise in the Making*

By RICHARD ST. BARBE BAKER

THE DISCOVERY of vast underground water supplies in the world's most famous desert and the application of new techniques in large-scale tree planting under desert conditions have shown that 2 million square miles of the Sahara can be reclaimed and made productive.

The enormity of the Sahara Reclamation Program dwarfs any other reclamation and rehabilitation project ever before planned. To understand what is involved, it is necessary to grasp the present extent of the Sahara and the speed at which it is advancing. Its 5 million square miles would contain an Australia and a half. It is over one-and-a-half times larger than the United States, and each year it is advancing relentlessly along a two-thousand mile front, often to a depth of 30 miles in a single year.

Before the First Sahara University Expedition, the popular belief was that the Sahara had always been a desert and always would be a desert. This assumption is not true. There was a time when large parts of the Sahara displayed a high state of culture, evidenced by the many rock drawings discovered recently. In 1952, the First Sahara University Expedition collected much valuable evidence to show that wide areas of the Sahara were created in historic times. Wave after wave of invaders felled the forests to make farms and left a trail of destruction behind them.

Chateaubriand has said: "Les forêts précèdent les civilisations, les déserts les suivent." Cities rise where forests are razed. Prosperity is built upon what the forest yields and declines when the indirect or biological benefits

of the forest are lost by the removal of tree cover and the essential link in the water-cycle is broken.

#### *When Trees Vanish*

IN THE CONFLICT between man and trees and the rise and fall of civilizations, the trees over a period of time might win back their supremacy, were it not for the goat—the *bête noire* of the forest. The mediaeval historian Ibn Khaldun remarked:

*The grandfather raises sheep*

*The son raises goats*

*The grandson raises nothing!*

The Romans colonized about 2 million square miles of North Africa, concentrating on wheat farming in much the same way as did the farmers in the United States. It took longer, of course, for the Romans to devastate the land than it took the "Wheat miners" of the Seven States to form the notorious dust-bowl.

The Roman colonists of North Africa were subsequently driven out by the Arabs and their goats. It has been calculated that each Arab had about 100 goats; 100 million goats, following in the train of a million nomadic farmers, would devour the soil-protecting trees like giant locusts. When the trees disappear, the land becomes feverish; the spring water-table sinks.

It is vital to have tree cover in continental countries; for, when the trees vanish, the desert comes. As trees are the essential link in the water-cycle, the only way to reclaim the desert is to restore the green mantle of trees. To do

this the ravaging goats must be restricted; animals must not be permitted to devour whatever little is left of green growth. The excessive grazing of cattle, sheep, and goats is as damaging to the land as wholesale felling of trees. The new countries of the Sahara are considering the advisability of turning from an animal economy to a sylvan one. Already mountainsides, made bare and eroded through excessive grazing, are being transformed under the *banquette* system along the contours and are producing apricots, figs, and cereals; and the landowners and their cultivators are now living happily under a grano-fructuarian economy.

We know now that it is possible to produce meat and milk of high quality direct from the plant kingdom. From the experience of the Saharan reclamationists it will not be long before modern technology makes livestock-farming obsolete, though it will take a little time for habit to catch up with discovery. These new foods are not only of superior taste, but richer and more wholesome, easy to prepare and cheaper to use. Along with home-grown vegetables and garden-fresh fruits, which luxuriate in the lands so rich in trace elements eroded from the mountain sides, this protein-rich plant-meat will advance and improve the human way of life.

In *Sahara Conquest*<sup>1</sup> I have shown that soil-plant-man make a single nutrition cycle. It is because the emerging countries around the Sahara are realizing this and fully appreciate the place of trees in their economy that they are making such tremendous strides in restoring tree cover and in food production. Morocco, Algeria, Tunisia, and Libya are forging ahead in large-scale tree planting. It was the late King Mohammed VI of Morocco who inaugurated Les Forêts Jeunesse. The Tree Week, December 8-15, would see him mounted on his fine horse riding up the mountainsides, followed by thousands of young planters, assisted by foresters and nurserymen with lorry

1. (London: Lutterworth Press, 1966). Awarded Millennium Guild of New York, Freshel Prize, as the Book of the Year making the greatest contribution to humanitarianism.

loads of tens of thousands of young trees. In a few months' time, new forests were on their way, for, if planted with sympathy at the right time, trees grow rapidly.

Particular planting tasks are carried out each year by young voluntary labor, under expert guidance, from Tangier to Agadir, and from Marrakesh to Ujida. These young volunteers devote every Friday and Sunday, their free days, to planting until February 16 and even longer in some places if the good weather serves.

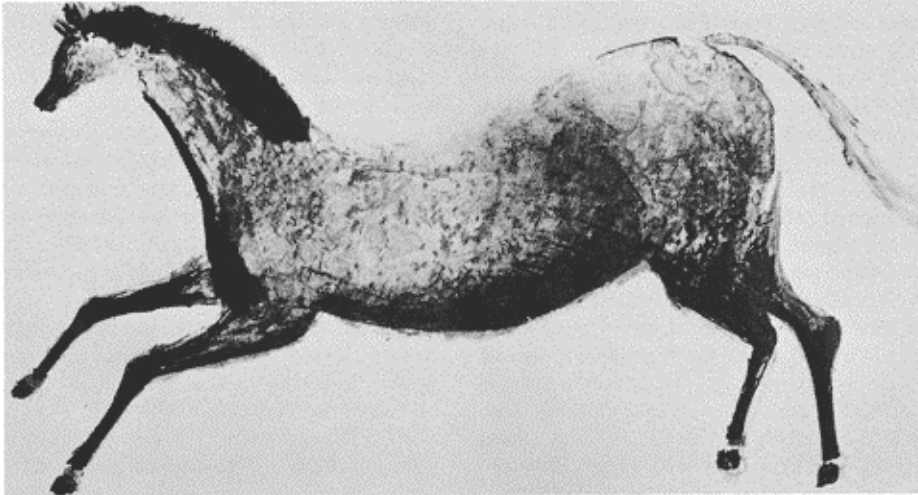
### *A New Way of Life*

ALGERIA TOO, is demonstrating successfully a new way of life based on orchard trees and the growing of cereals. Michael Scott of Tangier, Secretary of the Sahara Reclamation Program for North Africa, drove me through extensive regions where the *banquette* system has proved successful beyond all expectation. Little banks are thrown up with the help of crawler tractors, if not too steep, or by hand, along the contours. Apricots and figs are planted along the banks, and cereals are cultivated in between. Where the slopes are too steep for cereals, they are planted with forest trees of mixed species.

On the weekends, thousands of young people pack into lorries with their rucksacks and planting tools and, under the supervision of trained foresters (who voluntarily devote their free time to this work), plant millions of trees for the fun of it, believing that this is the best way of helping their country.

Tunisia is equally enthusiastic about planting trees and is creating a 600-mile shelterbelt to modify the climate and provide protection for growing food. In one dune area near the sea, over 36 million olive trees have been planted since 1950 and these are already yielding over a million tons of olive oil a year.

In Libya, too, fast-growing eucalyptus are being planted on the sand dunes near the sea, to stabilize them, with the help of new techniques developed by Esso Research Ltd., of Harpenden, Herts, England. Both in Tunisia and in Libya, I saw hundreds of forest workers



carrying trees in pots on stretchers and placing them in readiness for the planting gangs following immediately behind them.

Under the old method, each individual tree had to be surrounded by a little fence of palm leaves or grass, to stop the drifting sand from burying it — this is called "dissing." With the new method the trees are simply planted in the sand. Then a 7-ton tanker equipped with huge balloon tires and loaded with a specially prepared mulch makes its way along the planted area while four men spray the dunes with a dark film. This oily mulch, while fixing the sand, allows any rain that might fall to penetrate to the roots of the trees. It also reduces evaporation from the soil, and it may reduce transpiration to a minimum, permitting the roots to establish contact with underground water supplies. The sun, shining on the black surface, draws up moisture to the roots, and the trees are thus watered from below. A wall of heat is thrown up from the blackened area and the rain-bearing winds from the sea are driven up to a considerable height and fall as dew, or even fine rain. By the time the mulch has worn away, the trees have taken possession of the dunes, stabilizing the sand while fulfilling their vital functions of transpiration, reinforcing the rain-bearing winds, providing shade

and shelter, creating a micro-climate within a climate where gardens can flourish and homes be established.

The prophets of old who saw blossoming deserts were not visionaries, but seers of reality. It is only now that science has made these visions come true.

#### *Fulfilling a Dream*

IN THE UNITED ARAB REPUBLIC my dream for Sahara Reclamation is now being fulfilled. As a guest of the Deputy Prime Minister, who controls the whole of the vast Egyptian reclamation project, I visited Tahir (Liberation) Province, an entirely new area which was once the granary of the Romans, but which, for 2,000 years, had grown nothing. Now, irrigated with water from the Nile, conducted in huge cement canals with an elaborate network of smaller ones, one million acres of desert are giving way to cultivated farms which raise a great variety of fresh vegetables and fruit.

The average size of an irrigated farm is from 4 to 5 acres, which will support up to 15 people. Not all of them, of course, were living on the farms, for some were working in town, others were attending school or Agricultural College, or were at the University. Each farm was surrounded by a double row of casuarina

trees and each field of one acre had a single row of the same tree around it.

It was a grand experience for me to visit the Director of Agriculture, surrounded by happy farmers, and to catch their enthusiasm for turning desert into prosperous farms. It was with real pleasure that I accepted an invitation to talk to the boys and girls in some of the schools. Each village has its own school and water tower and community center, run as a club. Life in the Tahir Province attracted me so much that I thought if only I were free I would love to go and live there with them and work on a farm in that happy community.

The Reclamation work in the New Valley, 400 miles south of Cairo, under the supervision of the Chairman of the Desert Development Organization, proved even more exciting. Two thousand ancient wells have been discovered, many buried under sand; yet, when the sand was cleared away, they began to give water again.

The new techniques are astounding, for they supply the answers as to how long the underground water, tapped by boring to depths of two or three thousand feet, may be depended upon to remain artesian, with water rising to the surface spontaneously, thus avoiding the need for pumping.

At Dakhla I stood by a new gusher, one of the thirty I had visited. There, from a depth of 3,600 feet, water was rising with such force that the electronic computer assured us that it would gush for 200 years before it was necessary for a pump! The water in that gusher, by which I stood, had flowed into Lake Chad, 1500 miles away, more than 200 years ago.

The Sudan has a progressive planting program and is creating huge shelter belts.

In Ethiopia I was greeted by my old friend, Professor Richard Pankhurst, Lecturer in Ethiopian Studies, and, through his good services, was granted a private audience with His Imperial Majesty, the Emperor, Haile Selassie, who generously consented to become Patron of the Sahara Reclamation Program. His illustrious predecessor, Menelik II, by saving Addis Ababa, that City of Destiny, by planting fast-

growing eucalyptus, had been acclaimed Patron Saint of the first Men of the Trees, which came into being at my forestry camp at Muguga, Kenya, on July 22, 1922.

In Kenya today there is a progressive forestry department, side by side with a very active Men of the Trees branch, whose President is Chief Josiah Njonjo, my interpreter at the First Dance of the Trees, described for the first time in the *Teachers World* in the Spring of 1923.

All the countries around the Sahara who have struggled for their freedom are now gradually coming together in the gigantic task of Sahara Reclamation.

After having visited the heads of state in the countries in and around the Sahara to enlist their concerted cooperation, it was my great privilege to entertain many of their representatives at the Sixth World Forestry Congress, which opened in Madrid on June 6, 1966. The 2,778 members and delegates there, from 92 countries, gave enthusiastic support to my proposals to call upon all Member States of the United Nations and countries represented at the Congress to use their manpower for large-scale planting; to treat the protection of the soil by adequate tree cover as a First Line of Defence; and to declare total war against the oncoming deserts of the world.

Significantly, Pope Paul, in addressing the Assembly of the United Nations in New York, said that it was not enough to dole out food to the starving peoples, but that we must give technical aid and reclaim the deserts to feed the people. He was aware that two million square miles of the Sahara, if reclaimed with the help of trees, could provide food for more than the present population of the world. The Sahara Reclamation Program submits that with world participation, 3,850,000,000 people could be sustained in the 2,000,000 square miles capable of being reclaimed.

Did 'Abdu'l-Bahá foresee Sahara Reclamation when he pronounced:

This is the hour of the coming together of the sons of men . . . the earth will indeed become as a garden and a Paradise?