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Mr Howard

42

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114

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THE DEVELOPMENT OF THE TAFRATA ESTATES.

Faint, mostly illegible text of a report or letter, possibly detailing the development of the Tafrata Estates. The text is mirrored and difficult to read due to the quality of the scan.

THE DEVELOPMENT OF THE TAFRATA ESTATES.

I paid two visits to the above estates during May 1935 in order to prepare an independent expert opinion on the possibilities of these domains when brought under canal irrigation. The first visit was paid on May 10-12 and occupied three days. During this period the various factors concerned with climate, soil, natural vegetation and the water available for irrigation, including the extent to which this is now being utilized, were chiefly studied. I was also furnished with a statement of the fundamental economic reasons which had led to the acquisition of these lands, with the plans for their development, and also with a number of soil and water analyses; in addition, I was provided with a large amount of useful local and other information bearing on the case. All these statements and data together with my notes and observations were carefully studied and correlated at Tlemcen on May 13th, so that on my second visit on May 14th and 15th I could view the problem as a whole and form a considered opinion on the project after being fortified by a knowledge of all essential factors and details.

Situation and area. The estates consist of five large pockets of deep reddish soil in a desert area (known as the plains of Tafrata) almost midway between the towns of Oudjda and Taza in the northerly extension of the Sahara desert, which in this region approaches the Mediterranean Sea. This tongue of desert

land, which is the real natural frontier between Algeria on the East and Morocco on the West, is about 100 miles wide at the point where these estates occur. Three of these large pockets of deep soil are close to the old military post of Taourirt and comprise 9000 hectares (22,500 acres) i.e. about 40 per cent of the entire property. The other two pockets of 9000 and 5500 hectares occur at Mahrouf and Sangal. It will be convenient to refer to these three areas as the Taourirt, Mahrouf and Sangal estates.

Communications. The estates are traversed by good railways and roads, which are already provided with telegraph and telephone facilities. The broad gauge railway and the Grand road which run through the French possessions in North Africa from Tunis on the East via Algiers and Oran to Casablanca and Rabat on the West, pass through the centre of the Taourirt estate. The Mahrouf estate lies a little to the south of the broad gauge railway but is connected therewith by a good narrow gauge line, which takes off at Seflet and runs through the estate and then almost due South for some 200 miles. There is a good road closely parallel to this narrow gauge railway. A branch road and a branch broad gauge railway run northward from a point to the East of the estates to the port of Nemours on the Mediterranean. The produce therefore will be in close touch both with the local markets in North Africa and with those of France. The sea trip from Oran or Nemours to Port Vendre takes about 24 hours. Produce sent from the estates to Paris would be about 48 hours on the way.

Climate. The climate of the plains of Tafrata is typically desert. Rain falls during the colder months (November-February) on about 20 days on the average, the total precipitation being about 6 inches. During the rest of the year clear blue skies with very low humidity are the rule. During the six summer months (May to October) the temperature rises considerably. In spite of this, however, the climate is remarkably bracing and very healthy. Some of the health resorts of the future are certain to be located in the Sahara desert once the medical profession of the Occident begins to study and to investigate the health giving properties of dry desert air. Its value is well known to the Orient.

Soil. The soils of the northward extension of the Sahara are reddish in colour and exceptionally rich in carbonate of lime. There is very little heavy clay. Except in the five areas all of which have been acquired for development purposes, the soil covering is thin, often less than one foot in depth overlying a limestone formation, and quite unsuitable for irrigation. Local competition with this enterprise is therefore out of the question. The soils of the two estates can be examined to depths of at least 30 feet in a number of profiles which have resulted either from the work of the engineers in the construction of the roads and railways or through the action of winter torrents which have carved a passage for storm water through the light soil down to the

underlying rock. These sections show that the soils of the estate are remarkably similar and consist mainly of permeable layers of fine calcareous sand alternating either with similar beds containing water-worn pebbles or with layers, a few inches thick, containing a somewhat higher percentage of clay than the calcareous sands proper. In the many profiles examined nothing in the nature of calcareous or clay pans was observed. These soils are remarkably well aerated throughout their entire depth. This factor will enable deep-rooted plants like lucerne to utilise at least 30 feet of earth, which is ideal for such a crop.

As would be expected from the naked eye manifestations, the chemical and physical characteristics of these soils are remarkably uniform. More than 1200 analyses in all have been carried out both on the surface soil and at intermediate depths down to 10 metres. The results repeat themselves. Appended are 10 physical and chemical analyses from Gouttetir (one of the three areas of the Taourirt estate) which can be taken as typical of the whole 23,550 hectares. The figures (Appendix A.) show that we have to deal with soil conditions which are probably unique in the whole world. There is practically no difference in the physical constitution and in the chemical composition of the soil from the surface to a depth of 30 feet. The soils are calcareous sands containing over 30 per cent. of calcium carbonate, the ideal amount of clay (10 to 15 per cent.), with about 1 per cent of

organic matter distributed throughout its entire depth. This organic matter owes its origin to the remains of the root systems of countless generations of desert plants which have to obtain their water from great depths. In this way the whole of these soils down to the underlying rock has been manured by natural agencies. The content of humus, as would be expected, is negligible. The percentage of total nitrogen is what would be expected from the content of organic matter. There is ample phosphoric acid and a super abundance of potash and lime.

As will be seen in a later paragraph the problem of exploiting these soils has already been solved. The problem consists in utilizing the organic matter left by the roots of desert plants to fix atmospheric nitrogen for the lucerne crop which in its turn not only yields heavy crops of fodder for sheep but also enriches the soil by accumulating a large store of root residues. In this way these desert soils can be made to manure themselves; the purchase of artificial manures is entirely unnecessary.

Irrigation water. The only perennial rivers in Morocco - the Moulouya, the Melloulou and the Za - are available for supplying the canals which will command the whole of the area of the three estates including the additional block at Sangal which has been acquired for development at some future date. I did not inspect the land at Sangal.

The Moulouya, the largest of the three rivers, is a snow-fed stream which rises in the Moyen Atlas mountains and flows northward past the estates on its way to the Mediterranean. Although the winter rains of 1934-5 failed, nevertheless at the time of my visit (May 1935) there was a good flow of rather muddy water, which at certain times of the year is bound to carry fine silt to the lands of the Mahrouf estate and to deposit considerable quantities of soil in the canal itself. The addition of fine silt to the soils of the Mahrouf area will tend to improve rather than diminish their fertility. The silting up of the water channels, however, will involve a small annual expense in cleaning, during which the canal will have to be closed for a few days.

The second of the three rivers is the Melloulou, which rises in the Moyen Atlas mountains and joins the Moulouya near the point where the broad gauge line from Oudjda to Taza crosses both these streams. At the time of my visit there was a good flow of clear jade-green water in this stream, the water of which commands the subsidiary estate of 5,500 hectares at Sangal.

The third and smallest of the three perennial rivers is the Za, which rises at Berguent (Ras-el-Ain) in a pond fed by many springs from an artesian source. There are a number of similar springs lower down the stream which increase the flow. The waters of the Za will be used to irrigate all three sections of the Taourirt estate.

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When examining these three streams and the land on the banks I was unable to discover the slightest trace of alkali salts. Had these salts been present they would have betrayed their existence by a white efflorescence on the surface of the soil. The absence of these injurious alkali salts is confirmed by the results of periodical analyses of the waters of these rivers extending over two years. Eight of these analyses are appended (Appendix B.). They show that the waters of these rivers are suitable for irrigation purposes and that none of them contain injurious quantities of saline matter. The Za appears to contain the largest amount of dissolved salts.

Preparation of the Land. Very little preliminary preparation of these estates will be necessary prior to irrigation. The sparse desert flora will be destroyed by the first ploughing. There are no weeds. If care is taken to destroy any which appear during the early years of development there should be no weed nuisance of any kind. The natural slope of the surface is almost exactly that needed for the even flow of irrigation water. There are few depressions to be filled up and practically no hillocks will have to be levelled.

Seepage from canals and ditributaries and the danger of over-irrigation. Although a high degree of soil permeability is a great advantage for promoting soil aeration and growth, nevertheless such a porous soil becomes a disadvantage from the point of the

canal engineer whose function it is to deliver the maximum amount of water at a given point with the minimum loss through seepage. Unless sufficient supplies of impermeable clay can be found locally for the floors and walls of the canals and distributaries, the question of providing a concrete lining in those areas where loss of water by seepage is considerable should be carefully considered. I understand this matter has not been forgotten and that it has been allowed for in the estimates. A suitable lining will save water and also check the waterlogging of the subsoil. The ideal method of dealing with seepage would be to line the canals and main distributaries in stages. The most permeable stretches should be lined at the time of construction and the cost included in the initial capital expenditure. The remainder could be done by annual instalments and paid for from a development fund, financed by a small percentage on the net annual profits. In a few years the whole of the canals could in this way be improved out of all knowledge and their efficiency vastly increased. At the same time the estates would be adequately protected from waterlogging, which is often the weak point in almost every scheme of perennial irrigation. As a rule, such projects are based and financed entirely on the engineering aspect and little or no attention is paid to the life of the canal colony itself - the only thing which really matters. In the present project I understand the engineers will contribute their knowledge and experience: they will not be allowed to dominate the scheme.

Besides the control of seepage, over-irrigation must be prevented from the outset. Care must be taken to apply sufficient irrigation water to moisten the soil down to the underlying rock and no more. This can be arranged for by means of accurate records of the well levels in the various blocks. If these levels rise, the amount of irrigation water applied must at once be reduced. It will be safer to apply too little water than too much.

Labour. The construction of canals, roads, and buildings will need a considerable labour force, especially during the early years. The care of the large numbers of sheep it is proposed to raise as well as the handling of vegetable crops like tomatoes and beans can only be profitable provided a supply of trainable labour is available. I understand that no difficulty will be experienced in obtaining the necessary workers from the Riff and also from the locality. The supply of suitable shepherds in a zone of nomadic agriculture depending on flocks of sheep and goats obviously presents no difficulties; every Mahomedan in such areas is a potential shepherd.

Indigenous canals. As would be expected, the people have made use of some of the irrigation water now running to waste in these rivers. A small canal, 80 kilometres in length, has been in operation for centuries at Taourirt where it irrigates a narrow strip of land 4000 acres in area parallel to the river Za. The

soils brought under cultivation in this way are perhaps a little heavier in texture than those of the Tafrata estates, but are of the same class - deep calcareous sandy loams rich in phosphates and potash. Some of this native cultivation was examined near the town of Taourirt. The crops of wheat, barley, beans, vegetables and vines were good but not exceptional. These crops and the trees near the town were, however, remarkably healthy and I detected no evidence of insect or fungoid disease. The foliage of the trees showed that the roots are making full use of the abundant supplies of potash in these soils. I found no trace of alkali salts on this irrigated land. As would be expected, the natives do not understand how to make the best use of their supplies of manure. I saw several heaps of unfermented vegetable and animal wastes ready for application to the soil which could only produce a fraction of the possible advantage which is easily possible through the adoption of the recent bio-chemical work on this subject.

An experiment in the development of the Tafrata estates.

In 1931 an interesting beginning was made in the development of these properties. The indigenous canal from the Za, referred to in the previous paragraph, was extended by 7 kilometres to irrigate an area of 184 hectares of desert land forming a portion of one of the blocks of the Taourirt estate. This lies to the north of the town and about a mile from the Za. These 184 hectares were

sown with a Spanish variety of lucerne in 1931 and at the time of my visit (May 1935) the crop was in its fifth year. I have never seen lucerne so much at home as at Taourirt. The growth was perfect, the stand was exceedingly vigorous and free from the slightest trace of disease, the root system was remarkable in the size of the tap-root and in the development of the laterals. I was assured that no manure, natural or artificial, had been applied to the crop since it was sown in 1931. Nevertheless, the lucerne, which I was informed yielded 13 to 16 cuttings a year, is obviously getting a large supply of combined nitrogen from somewhere. How is this obtained ? As no steps were taken to inoculate the desert soil with earth containing the nodule organisms from Spain or elsewhere, there is none of that nodular development on the roots in the surface soil which is usually met with in this crop. The only other sources of nitrogen are two: (1) combined nitrogen obtained by the nitrification of the soil organic matter, and (2) fixation from the atmosphere. I believe the lucerne crop at Taourirt is obtaining a large amount of its nitrogen by means of fixation from the atmosphere. If this turns out to be the case, we have here a state of affairs quite outside the experience of agricultural science. Nature has put the efforts of the factories which produce synthetic nitrogen compounds completely in the shade. The factory will never be able to produce, distribute, and accumulate combined nitrogen at no cost as seems to be Nature's

way at Taourirt. As 13 to 16 cuttings are got from lucerne which obtains its nitrogen by fixation in the soil and by the nitrification of the stores of organic matter left by the roots of desert plants, and by the lucerne crop itself, the question naturally arises what yields can be obtained when the root nodules are active and when the surface soil is furnished with fermented organic matter. I see no reason why at least 26 crops a year, one every fourteen days, cannot be reaped under these conditions. I have myself obtained many cuttings of lucerne a year in India with the help of frequent dressings of humus, but my best efforts did not compare with the stand I saw at Taourirt.

The production of lucerne, striking as this is, is only a part of the story. A considerable accumulation of organic matter, rich in nitrogen, phosphates, and potash, is taking place in the soil in the form of lucerne roots and the residues derived from these roots. After a number of years it will pay to exploit this store of soil organic matter by the growth of cereal or vegetable crops and then to begin the rotation all over again. The lucerne crop at Taourirt, therefore, not only manures itself but leaves the land in the proper condition for other crops. Experience alone can place an accurate figure on the residual manurial value of the lucerne crop. It is, however, certain to be considerable.

The capital and operating costs relating to this experimental area which were shown me are of great interest. The lucerne crop when fresh, semi-dry, or in the form of lucerne hay is fed to sheep.

This is diluted with maize and barley straw before it is given to the animals. The area of 184 hectares provides sufficient lucerne for 15,000 sheep a year, which are sold in Paris at the rate of 300 a week. Each hectare, therefore, produces sufficient leguminous fodder for over 80 sheep a year, a very high figure. The capital cost of the extension of the Za canal came to 700,000 francs. The total capital expenditure involved in putting the 184 hectares into lucerne, including the cost of the canal, was 1,800,000 francs. The net annual profit, average of the last four years, reached the high figure of 9640 francs per hectare, or 130 francs per lamb and 160 francs per ram or ewe sold. This works out at a total annual profit of 1,773,760 francs or nearly 100 per cent of the total capital expenditure.

The future development of the Taourirt and Mahrouf estates.

I discussed with the proprietor of these estates at great length his schemes for the utilization of his properties. He considers that a large area should be put under lucerne and that the produce should be used: (1) to feed lambs which will be sold when about 8 months old on the spot to dealers for transport alive to Paris and to the towns of North Africa; (2) to produce baled forage, lucerne meal and feeding cakes for use in North Africa and elsewhere. Some of the land will have to be put under cereal crops like maize and barley for the production of straw for diluting the lucerne fed to sheep and other animals. Tomatoes and beans for

the Paris market will in some cases follow lucerne. I entirely agree with these ideas. The soils are eminently suited for the production of all these crops, the quality of which is certain to be far above the average. Another crop now under consideration is the production of grapes for Great Britain, for which the supplies are often inadequate and for which there is an enormous market at present free from restrictions.

SUMMARY.

It now remains to sum up my general impressions. This can conveniently be done by balancing the favourable against the unfavourable factors.

Favourable Factors.

- (1) Climate. This is under perfect control. The annual rainfall of 6" (Nov.-Feb.) can easily be supplemented by irrigation. The dry climate will help in the harvesting of lucerne.
- (2) Physical constitution and chemical composition of the soil. These are ideal.
- (3) Irrigation water. The supply is ample and of good quality.
- (4) Absence of alkali salts. These are not found in the soil or in the irrigation water. They are not likely to be produced after irrigation is started on account of the great porosity of the soil and the abundant soil aeration. Had there been any tendency in this direction these salts would have been

evident on the 4000 acres of native cultivation at Taourirt which have been irrigated for centuries.

(5) Preliminary preparation of the soil for irrigation. The cost of this will be very small as Nature has already done most of the work for nothing. There are no weeds to eradicate.

(6) Facilities for mechanisation. The large compact areas are very suitable for mechanisation, the detailed plans for which I understand have already been prepared.

(7) Labour The locality will provide all the labour which is needed. Wages are low: the pay for a man is 4 francs a day: a woman gets 2.50 francs.

(8) Communications. The estates are already joined up with the future markets by means of roads, railways, ports and steamers, telegraph and telephone.

(9) Disease. Both crops and sheep and the labour force are likely to be remarkably healthy and free from disease on account of the dry and stimulating climate.

(10) Markets. The estates will enjoy the use of the markets in North Africa and France protected by the French tariff system. In both these areas the supply of meat is inadequate. The quality is low. High prices therefore are the rule.

(11) Profits. The results obtained on the trial area of 184 hectares at Taourirt since 1931 show that when lucerne is fed to sheep which are sold in Paris, the net annual profit per hectare comes to 9650 francs (approximately £50 per acre) a sum equal to the total capital expenditure.

Unfavourable Factors.

(1) The possibilities of the scheme itself. The only weakness I can discover in this project is its unique character. It deals with the creation of the perfect oasis under perfect climatic conditions on the lines of the very latest scientific achievements. The world has no experience of such projects or of the results which have been obtained at Taourirt. It is difficult therefore to realise that these estates are more valuable than oil, coal, water power or the Cinchona plantations in Java.

It will be seen that the favourable factors much more than balance the unfavourable. The only unfavourable factor lies in the great possibilities of the Scheme itself. This, however, will rapidly be removed the moment the Tafrata estates are in working order.

In my opinion this development project is an absolutely safe one and will yield a financial return of the same order as the Suez Canal and similar key enterprises. The capital sunk in the development of the Taourirt property, including the canal from the Za, will be more than safe as there is a profitable use for the land even if direct production should be given up. There will be no difficulty in letting such irrigated land at a high rental to groups of cultivators, French, Spanish and indigenous.

These rentals alone, less the cost of administration, will yield a substantial return on the capital.

Mycologist to the Imperial Department of Agriculture in the West Indies 1899-1902; Botanist to the South-Eastern Agricultural College, Wye, Kent, 1902-1905; Imperial Economic Botanist to the Government of India, 1905-1924. Director of the Institute of Plant Industry, Indore, and Agricultural Adviser to States in Central India and Rajputana, 1924-1931. Honorary Secretary, British Science Guild, 1932 to date.

Oran, 17th May 1935.

H. Piene Maître

Tafara Estates

GENERAL CONCEPTION,

The possession and the production of an essential and first class raw material has often been the surest source of the large fortunes that have been made and it is thanks to same that they have both been kept up and have grown.

When this raw material has been judiciously chosen in respect to the world's absorption, and it also enjoys a privileged geographical position and moreover combines abundance with an exceptional quality, the existing or possible competition must be disarmed because of its being outclassed.

This is the reason why the few privileged exploitations that have been worked up on such bases have necessarily enjoyed a preponderating position because their development could not but follow a natural course as powerful as lasting.

Such was the case of British coals, American petrol, African phosphates, the Quinine Monopoly of the Dutch West Indies, etc., etc.

These "crus" of indispensable raw materials are solely a phenomenon of Nature wherein mankind simply intervenes to ensure their normal exploitation without having, in any way, to modify them, with the object to improve upon them. The ever and all powerful Nature alone -, as their sole author and reason, - has provided for everything, viz:- their exceptional value and precious conditions as well as all outlets which the World's needs must ensure them.

Taking a stand on these economic principles Mr P.M. considering moreover that security (which is a most vital factor) lies in the fact that he must necessarily sell before even producing, has since 1911 made researches of a raw material, which in spite of all fluctuations could not in any way run the risk of either a depreciation in price or encounter a likely competition, even in times of world's crises.

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has *all* *and* This raw material is represented by foodstuff of vegetable origin, for animal consumption, which Nature produces automatically under transcendant conditions.

Researches and Discovery of the Exceptional Region especially adapted for exceptional vegetations in an exceptional geographic and economic position.

In order to be able to produce under exceptional conditions it was necessary to choose and find the vegetations which would be most appropriate to foodstuffs and would therefore instill into the organs which it was meant to feed, the highest dose of "assimilat~~ing~~ing Nitrogen", which through the proteines is the basis of the "albuminoïdes", which in turn is one of the primary elements of life.

It was thereupon necessary to discover the very special regions which would be most suitably adapted for the growing of such vegetations, in order that their development could be ensured in a perfect and non interrupted manner.

Starting therefore from the aim in view, i.e: unlimited

outlet but having constantly in mind the one concrete object i.e: the production of foodstuffs under extraordinary conditions, Mr.P.M. has spent 20 years in minute investigations, researches, tests and undisputable realisations.

This momentous task which has been undertaken for years on several continents without its author ever accepting to take for granted in any manner whatsoever any of the numerous contingencies which arose & which apparently at times could not be solved; he well knew that in thus acting he was increasing his chances of failure as against his chances of success. But having laid down the principle that to attain an object of such magnitude neither time, distances nor expenses whatsoever could be taken into consideration, he finally and fully succeeded in North Africa.

These unceasing & untiring efforts enabled Mr.P.M. to discover the most ideal conditions that Nature can possibly offer, viz: the practically free & permanent production of assimilating Nitrogen, the primary and infinitely rare basis to the most intense vegetable productions.

One region has been found to realize to perfection this object and this region moreover holds a privileged position both economically & geographically in central North Africa (where the lack of food is public knowledge) and within immediate proximity of the European Continent providing thus unlimited outlets.

Absolute Homogenesis of the Soils & Sub-Soil.

1,206 analysis, physical, chemical & micro-organic have been made of waters, soils & sub-soils to a depth of 10 metres, in all seasons & over a period of 21 consecutive months, and they one & all have confirmed that the composite nature of the soil & sub-soil, - as is visible to the naked eye, - is absolutely homogeneous over the whole of these unique domains in Africa and doubtless in the world.

Irrigations.

Considering the general lack of water on the North African Continent it seems almost incredible that these domains are situated at close proximity of three large rivers with a constant flow all the year round whatever the adverse climatic conditions may be and which are invariably the same on this part of the African Continent viz:- a total absence of rain during the seven consecutive hot months of the year.

Thanks to regular high temperatures, constant dryness of the atmosphere, the physical & chemical composition of the soils and sub-soils admirably sterilized and a very simple irrigation system, which will permit a never-hindered distribution of the strictly useful quantities of water during 340 days of the year, these domains will produce in a permanent & constant manner the assimilating Nitrogen which is the pre-eminently fertilizing element of all vegetable food both as regards quality & quantity.

These facts, which it is practically impossible to find anywhere else, will cause quite naturally, and almost automatically, the

most intense productions of vegetable food in the world.

Fertility.

The fertility of the domains is such that one may reckon every year on 13 crops per year; every crop reaching maturity between 18 & 23 days. In winter -November to February- during the rainy season which extends over about 20 days and during which time the temperature is not so high, 3 crops only can be expected in these four months, these 3 crops are included in the above 13 yearly crops.

In the years when temperature rises earlier in the spring (February) and lasts later in the autumn (November) and this happens about 2 or 3 times every ten years, the number of crops can attain 14 or 15, which has already taken place in one year.

An important factor is that after the initial preparation of the soil prior to sowing, no tilling of the land is necessary and the seeds of the vegetable foodstuffs for animals need not be renewed for scores of years.- Moreover the upkeep in a perfect state -tilling being practically done away with- is insignificant because the soils are continually sterilized by the intense & dry heat.-

This state of things (sowing done once & for all and no upkeep) which considerably reduces the already very low cost price due to the enormous quantities which can be produced, is solely an act of Nature.

Productions.

The most remarkable European meadows produce a maximum average of 160 cwts of green food, equal to 40 cwts of dried food, per

Hectare, whereas the domains will produce a minimum average every year of 1,000 cwts of green food, equal to 280 of dried food, per Hectare.

The consequence of this unique production is that whereas the world's richest regions can feed at the utmost 10 sheep per Hectare per year, the producing acreage of the domains, which is rigorously homogeneous, has a feeding capacity of 40 sheep per Hectare per year.

To obtain this result -the preparation of the soils before sowing having been done once & for all - two operations only are needed which in their extreme simplicity & cheapness are fully adequate:-

1° to irrigate at a cost practically nil,

2° to gather in at the world's lowest cost price.

That is all.

No other operation is required as the all-powerful Nature does away with all others, such as planting, cultivation, cleaning, upkeep, manuring, etc. all of which, -whilst complicating & multiplying farm-work, considerably increased difficulties, manual labour, risks, and cost price.

Exploiting Process.

The powerful & rapid system of exploitation which it has taken 2 1/2 years to bring to a perfect & extremely simple system is adequate to the enormous production of these vast domains and are by far & away the most economical that have ever been put into practice.

This system will deal with 20,000,000 cwts of animal food

every year and farming operations of all kinds such as preparation, sowing, irrigations, reaping, treating, gathering, loading, cartage, unloading, dealing out, grinding, chopping, storing, unstoring, mixing, delivery, distribution on any part of the producing domains will be handled by labour totalling less than 500 men.

Labour.

The labour available in the neighbourhood is over 30,000 - all men of well-known working qualities.

Communication & Transport.

The main railway line from Tunis to Marrakech, via Constantine, Algiers, Oran, Fez; Rabat, Casablanca, with a regular service of Restaurant & Sleeping Cars, runs accross practically the whole length of the domains. The National Main Road also passes through the latter and is used daily both ways by numerous motor-cars.

The station of this normal gauge railway is on the spot, thus putting the domains in direct communication with the port within five hours.

There is furthermore a post office, telegraph, telephone, every facility of revictualling, as well as doctors, chemists, hospital, hotels, schools, markets & police.

The climate is particularly dry and known to be perfectly healthy.- The security is absolute.

Outlets.

It must be remembered that Tripoli, Algeria, Tunis & Morocco, for natural causes that are everlastingly adverse, cannot, -owing to lack of water for about 7 months in the year, - grow sufficient food for their animals and can therefore only produce meat in ^{very} small quantities & of ^{very} inferior quality during about 3 months (March-April-May); these 4 countries must look to importation from France & South America for their own consumption. The want of meat, wool, milk & butter is the well-known curse of the North African Continent

Moreover the world's statistics show that of all the principal raw materials meat is the only one which shows a practically continual upward tendency, especially in France, where it fetches higher prices than in any other country.

Thanks to the proximity of these outlets the animals from the domains will be delivered alive direct to the consumer and not frozen, as is the case with meat imported from the Southern Hemisphere which is the world's great purveyor. - North Africa which lacks almost totally this commodity, will, along with France, absorb the entire production of the domains at the highest prices.

These enormous productions of which the automatic regularity & quality cannot vary, coupled with the remarkable system employed for the reaping & dealing, have resulted in the lowering of an already exceptionally small cost price which cannot possibly be obtained anywhere else.

and will not

On the other hand the considerable difference between

this very low cost and the sale prices ruling both in North Africa and France, which countries are in absolute need of these products, will leave an abnormal margin.

The following four points will show that this enterprise is of public interest:

- 1) France, after a century of colonial organisation can only import from all her Colonies and Protectorates 1,25% of the quantities of meat needed by Home consumption.
- 2) Although textiles rank as the first exporting industry of France, amounting to 11 1/2 milliards francs yearly, the quantity of wool being produced by France and her Colonies only amounts to 7% of her needs, 93% of her wools having to be imported.
- 3) France imports yearly from the Southern Hemisphere about 8 milliards of meat and wool.
- 4) Owing to lack of rain North Africa during at least 7 months in the year cannot produce any animal food, hence her practically complete lack in meat, wool, milk and butter.

State Intervention.

If one considers on the one hand the national and general public interest of such an enterprise and on the other hand the credit and high esteem which the owner of these domains enjoys, it will be easily understood that the Government with the help and cooperation of the highest Civil and Military authorities have consented to modify the Survey of the country in order to grant to Mr P.M. absolute ownership of these domains, which must become the granary of North Africa and Europe's most powerful purveyor.

As regards the irrigation of the domains, the right to the water of the three rivers referred to above, has been granted by a Government Treaty, which has been confirmed by a special law passed by the Government of H.M. the Sultan of Morocco, under date 27th July 1929, and duly published in the Official Gazette of 27th August 1929.

In addition the matriculation of the domains has been made by the ~~Cherifian~~ Ministry of Domains and Title Deeds duly registered in the name of Mr P.M. by the Services of the Protectorate of the French Republic.