ROMAN AGRICULTURE AS DEPICTED BY
CATO, VARRO, AND Vergil

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>The Importance of Agriculture in World History</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>The History of Agriculture</td>
<td>4</td>
</tr>
<tr>
<td>III</td>
<td>Historical and Political Background of the Writings of Cato, Varro, and Vergil</td>
<td>19</td>
</tr>
<tr>
<td>IV</td>
<td>The Choice of the Farm</td>
<td>24</td>
</tr>
<tr>
<td>V</td>
<td>The Equipment of the Roman Farm</td>
<td>33</td>
</tr>
<tr>
<td>VI</td>
<td>The Major Crops of Roman Agriculture and their Production</td>
<td>47</td>
</tr>
<tr>
<td>VII</td>
<td>The Animals of the Roman Farm - their Care and Treatment</td>
<td>78</td>
</tr>
<tr>
<td>VIII</td>
<td>Birds, Bees, and Smaller Animals</td>
<td>94</td>
</tr>
<tr>
<td>IX</td>
<td>Fertilization and Drainage</td>
<td>106</td>
</tr>
<tr>
<td>X</td>
<td>The Religious Aspect of Roman Agriculture</td>
<td>113</td>
</tr>
<tr>
<td>XI</td>
<td>The Labour Supply on the Roman Farm</td>
<td>121</td>
</tr>
<tr>
<td>XII</td>
<td>General Conduct of the Farm</td>
<td>130</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>Modern Agriculture in Italy</td>
<td>139</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td></td>
<td>155</td>
</tr>
</tbody>
</table>

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CHAPTER I

The Importance of Agriculture in World History

Although Agriculture is universally regarded as the basic industry of the modern world, the fact that its paramount importance is as old as man himself is not always recognized. In the development of Agriculture every civilization has played its part; but contributions to Agricultural knowledge have been minimized in history by the more impressive legacies which each civilization has bequeathed to us as reminders of its greatness. Egypt has left us her temples and her pyramids, Babylonia her law and her literature. The gift of Phoenicia is her alphabet; of Crete, her exquisite craftsmanship in gold, silver, and ceramics. Our memory of Greece centres about her poetry and the deathless beauty of her art and her architecture; with quickened pulse we recall the grandeur of Rome, her conquering legions, her world-
wide Empire, and the storied patriotism of her heroes. But these memories, magnificent and glorious though they are, cannot, from the standpoint of human welfare, compare in importance with the humble story of Farming, which by slow, hesitant steps has progressed from primitive tillage to the specialized science of the present day. Nor has any one civilization or any one period alone been responsible for its evolution; our knowledge of Agriculture is the legacy of all ages and of all peoples. Neither has the development of Agriculture progressed uniformly through the centuries. Just as the Dark Ages represent an era of regression in all other branches of human knowledge, so during this period Agricultural information slowly accumulated during previous ages was temporarily lost to the human race. Not until the Agricultural Revolution in England in the eighteenth century did Agriculture once more begin to move forward. Since that time progress has been rapid; better methods of cattle-breeding, careful selection of stock, improved methods of cultivation, the use of commercial fertilizers, all these have increased the yields of agriculture.
and bettered the lot of the farmer.

Since the development of Agriculture thus parallels the story of the human race, it would be impossible to regard the Agriculture of any specific period as an entity complete in itself. Therefore, to obtain a comprehensive understanding of farming as practised by the Romans, it seems fitting, first to review the history of Agriculture from its beginnings to the present day; secondly, to consider the Roman theory of Agriculture as revealed by the writings of Cato, Varro and Vergil; and finally to sketch the rebirth of Italian agriculture under the Fascist Regime of Mussolini.
CHAPTER II

The History of Agriculture

In its earliest and crudest sense, the history of Agriculture begins among the Nomadic tribes of Southwestern Asia. Originally man gained a precarious existence by hunting, fishing, and gathering the wild fruits of the forest. Gradually, however, he learned that certain wild animals, notably the horse, the sheep, and the cow, could be domesticated; this knowledge represents the first stage of Agricultural progress. No longer was primitive man dependent for his existence solely upon his skill in the chase; true, a supply of food was necessary for his flocks and herds, but this was afforded by the bounty of Nature. If the supply of fodder failed in his locality, the primitive shepherd wandered with his flock to a new area where the supply was more abundant. There was as yet no attempt to raise crops by human intervention; agriculture in this early period was purely "extensive" or pastoral.
The second step in Agricultural progress consisted in the production of definite crops on the same land year after year. Continuous cropping introduced new elements into the agricultural picture; the soil must be cultivated and fertilized, crops must be sown and harvested - in a word, the forces of Nature must be supplemented by human toil. But the tools of early man were few and ineffective, his conception of fertilization vague at the best. Obviously this new development would take place, then, in regions where the soil was not only fertile, but also easily-worked: such areas existed in the great river-valleys and deltas, and it is here that we find agriculture striking out to new attainments. The lower reaches of the Nile, the valleys of the Tigris and Euphrates, the alluvial plains of the Indus, the Ganges, the Hwang-Ho and the Yangtze-Kiang, these are the stages for the next scenes in the drama of Agricultural progress.

Since husbandry, as practised by the peoples of India and China has had little or no bearing upon the advancement of Agriculture in the
Western World, a very brief résumé of farming in these areas will suffice. Among these ancient peoples of the Orient, agriculture has developed in the face of natural difficulties, for all the major rivers are subject to flooding at varied and unpredictable intervals. Despite systems of flood control developed through 4500 years, China is still subject to disasters from this source; in 1877, the Hwang-Ho broke through its man-imposed barriers bringing death to over a million Chinese; in 1898, fifteen hundred villages to the north and west of Tsinan were inundated with untold loss of life and property. Drought constitutes a second scourge, no less disastrous than floods. But it is a tribute to China's tenacity that, with only half her area suitable for agriculture, a population of four hundred million can be maintained upon the produce of her fertile river-valleys. One cannot help feeling that the dogged, persevering character of the typical Chinese has been developed in large measure by his age-old struggle to maintain his existence in the face of such relentless forces. In India, too, natural hazards to Agriculture abound;
a delayed monsoon means crop failure and consequent famine; a premature monsoon, death and destruction. But it is important to notice that, in spite of five thousand years of continuous cropping, the fertility of the soil has been maintained by careful cultivation and fertilization, - a direct refutation of a commonly-accepted theory that land "wears out". Agricultural land "wears out" only if the elements drawn from it by the plant growth are not restored to the soil.

Turning now to consider the early history of western Agriculture, our attention is arrested first by Lower Egypt. This ancient kingdom consisted of the Valley and the Delta of the lower Nile, a tract of level country approximately six hundred miles long from North to South, and twenty miles wide. Over all this area, the Nile in its annual flood spreads a marvellously rich coating of silt carried down from the high table lands of Abyssinia. Here, even with the crude implements of antiquity, the production of enormous crops and the maintenance of great herds were possible. It was no longer necessary for each individual to wrest his own livelihood from
the soil; since one man could produce food for twenty, the human energy thus released could be expended in new spheres of activity. New arts and industries grew and flourished; pottery, shoemaking, glass-blowing, weaving, these and a dozen other trades came into being. In a word, Egyptian agriculture made Egyptian civilization possible. Furthermore, to control the Nile at flood season and to conserve water for irrigation during the dry season, an elaborate system of dykes and canals was essential; such works could only be accomplished by widespread co-operation. Nor was the necessary co-operation easily established; long and bloody wars were waged as each individual village and state strove jealously to obtain its share of water. Slowly and surely, however, the costly lesson was learned, and even as early as 3400 B.C., Menes, prince of Memphis, had united the petty principalities around him into one state. Thus, while historians tell us of the great achievements of Ancient Egypt in art, science and government, it would be well to remember that these were made possible by the development of Egyptian Agriculture.
To the north and east of Egypt lies the other centre of early western civilization, the Fertile Crescent. This area, so famous in Biblical history, falls into three natural divisions; first, the valleys of the Tigris and Euphrates Rivers, comparable in fertility to the valley of the Nile; secondly the high tableland of Mesopotamia; lastly the country of Syria, which formed the connecting-link between Asia and Africa. The lands of Syria and Mesopotamia were mainly grassy uplands, ideally suited to the pasturing of flocks and herds, whose produce could be easily freighted down the rivers to the populous cities of the lowlands. Along the Tigris-Euphrates valleys, as in Egypt, flood control and irrigation systems were necessary; remnants of the vast engineering projects developed to these ends remain to the present day. The crops produced on these dyke-protected alluvial lands, were, in the main, the same as those of Egypt,—wheat, barley, sesame, flax, a little cotton, and tremendous quantities of garden produce. Few traces now remain of the once fabulous fertility of this area; on all sides the
barren sands of the desert have drifted in, and the uncontrolled rivers have made marshes where once great cities and prosperous farm lands existed. The actual fertility of the soil, however, seems to be unimpaired, and modern engineering projects bid fair to restore the fruitfulness of this ancient land. The ultimate collapse of the states of the Fertile Crescent was not, however, occasioned by natural causes; centuries of intermittent warfare among themselves weakened them to the point where they fell an easy prey to the rising power, first of Macedonia and later of Rome. It is to these European states, then, that we must turn for subsequent progress in Agriculture.

European agriculture, in common with all other forms of European civilization, found its earliest home in Greece. Here existed no mighty rivers to enrich the soil, no broad valleys offering promise of bountiful crops. Yet, from a study of early literature, it is evident that agriculture formed the keystone of Greek civilization; for example, in his description of Achilles' shield, Homer speaks of farmers tilling their fields, youths and maidens
plucking the grapes in the vineyard, and the king surveying his lands and the harresters at work. This picture is, of course, idealistic, and it must not be assumed that Greece was an agricultural paradise. Over most of the country the hilly nature of the landscape made the production of grapes and olives more profitable than the culture of cereals. In the Peloponnesus, however, the ground was more level and here, by careful irrigation spelt, wheat, and barley could be grown. The soil lacked the prodigal fertility of delta land; hence some form of fertilization was necessary. This was accomplished by leaving a high stubble at harvest-time which was later ploughed under. To us this seems a crude and inefficient method, but we are nevertheless indebted to the Greeks for realizing the need for artificial fertilization and for making a beginning upon this important branch of farming.

In Rome, as in Greece, agriculture was regarded as the most honourable form of human employment.

Our ancestors, says Cato¹, when they wished

¹. Cato, Agr. - at end of introductory paragraph.
to praise a worthy man, praised him as a
good farmer and a good husbandman; a man
so praised was thought to have received
the highest commendation.

From the sturdy yeoman families came the Cincinnati,
the Serrani and the Fabians - men whose names loom
large in the early history of Rome. But as Roman
territory gradually widened to include the whole
Mediterranean world, domestic grain could not compete
with that imported from Egypt and Sicily, where its
production was infinitely less expensive. Such com­
petition might have spelled the ruin of agriculture
in Italy, had not the Roman farmer shrewdly turned to
other branches of farming. The cultivation of the
vine and the olive, to which the climate of the
Italian peninsula was admirably suited, attained a
new importance; a new emphasis was laid on the breeding
of cattle and sheep; pasture and meadow land for the
maintenance of flocks and herds appeared where formerly
had been grain-fields, and the production of fodder
crops to supply feed during the winter months became
a recognized branch of farm activity. For the first
time in the western world, Agriculture had become truly
"intensive". Of the importance of Roman contributions
to agricultural science I shall speak later in more detail; suffice it to say for the present that not until the Nineteenth Century did agriculture again reach the heights which it attained during the late Republic and early Empire.

Under the later Empire and during the Dark Ages which followed, agriculture, in common with all other branches of human knowledge, sank into decadence. The one ray of light piercing the darkness is found during the Moorish occupation of Spain. In the region about Granada, in fertile valleys between the ranges of the Sierras, agriculture was fostered by skilful cultivation and careful irrigation. Here in almost unbelievable profusion grew oranges, figs, citron and pomegranates. Plantations of mulberry trees yielded food for the silkworm; orchards and vineyards clothed the hillsides and looked down upon broad fields of waving grain. Small wonder, then, that the Moors believed that the abode of their Prophet was situated in the Heavens immediately above Granada.

Elsewhere throughout Europe the Agricultural picture is uniformly appalling. Farming
knowledge, slowly accumulated during previous centuries in Mediterranean lands, lay hidden in manuscripts intelligible only to monks in the solitude of monasteries where alone classical learning and literature lived on. In a protracted period of general lawlessness, barbarian invasions, supplemented by the depredations of wandering brigands, rendered the life of the husbandman one of continual jeopardy, and robbed him of any incentive to produce more than the barest necessities of life.

Gradually, however, some semblance of order evolved from the chaotic situation. But it was an order based not upon justice, but upon force; all forms of human endeavour seemed to be tinged with a gloomy hopelessness. In agriculture there developed the Feudal System, under which the men who tilled the soil were either "serfs" or "villeins". Of the two, the serf was the more unfortunate. He was bound to the soil by law, and could not leave it; he was not, however, a slave, inasmuch as he could not be sold apart from the land. When required, he must work on his lord's estate and pay such dues as his lord
deemed fit. The villein, on the other hand, was free in person, and could change land or master at will. Living conditions of both serf and villein were deplorable; a mud hut, practically unfurnished, a tiny stable and a few square feet of garden comprised the peasant's home, and even this might be destroyed if his master engaged in war with some more powerful neighbour. Under such conditions of life and labour, agricultural progress was manifestly impossible. The harsh treatment of the farmer is reflected in the careless treatment of the soil. All arable land was divided into three great fields, in one of which wheat was grown, in the second rye or barley, while the third lay fallow to recuperate. The two fields under cultivation in any year were apportioned in narrow strips running the length of the field and separated by narrow ridges of turf. A number of strips, scattered at intervals throughout the fields, constituted the peasant's "farm". Fertilization was practically non-existent; cultivation, also, was crude and ineffective, owing to the fewness and inadequacy of farm implements. A wooden plow and harrow, a cumber-
some high-wheeled cart, a crude sickle, a shovel, mattock, and hoe,—these were the instruments of tillage. Judged by modern standards, crops were pitifully meagre; in view of such haphazard cultivation they could hardly be otherwise.

Such is the depressing story of Agriculture from the fall of the Roman Empire until the middle of the Eighteenth Century. But even while the American colonies were asserting their independence, and France was moving slowly towards Revolution, developments equally important but less startling were taking place in England. There the so-called "Agricultural Revolution" had begun; after fifteen hundred years of stagnation farming was once more preparing to move forward. The first, and possibly the most important changes, took place in crop rotation. With the improvements in this phase of agriculture the name of Viscount Townshend is forever linked, since it was he who first realized that root-crops and clover could be produced on the land formerly left fallow. Townshend's friend and contemporary, Jethro Tull, invented a machine whereby seed could
be sown in even rows and covered, instead of being broadcast on the land. The breeding of farm animals, too, was not long neglected; by careful selection of breeding stock Robert Bakewell produced sheep double in weight to those of a few years earlier; Charles and Robert Colling, carrying on similar experimentation with cattle, were equally successful. Early in the Nineteenth Century, with improvements in metallurgical processes, new farm machinery began to appear; in 1834, McCormick's "reaper" replaced the sickle; a crude threshing machine proved infinitely more effective than the flail; the cast iron plow and harrow, drawn by horses instead of oxen, slowly ousted their wooden predecessors. Better roads brought markets nearer; improved communication systems made interchange of ideas and information possible for the first time since the end of the Pax Romana.

Significant as these changes were, those of the past fifty years have been even more impressive. The evolution of the gasoline engine, coupled with the development of electric power, has materially reduced the drudgery of farm labour. The
radio and the daily newspaper bring crop, market and weather reports into the farmer's home; modern systems of transportation permit him to take advantage of this information and to market his produce at the most favourable moment. New crops and improved varieties of the old are constantly being introduced; soil tests and commercial fertilizers enable the agriculturalist not only to learn in what elements his soil is lacking, but also to remedy these deficiencies. In short, the modern farmer is at once a scientist and a business man.
CHAPTER III

The Historical Background of the Writings of Cato, Varro and Vergil

The purpose of the foregoing résumé has been to place Roman Agriculture in its proper perspective in Agrarian History. Next a brief consideration of the effect of political movements upon Roman agriculture seems essential. While it is almost trite to say that the political conditions under which an author lives will influence his work, it is particularly true that the events of contemporary Roman history exercised a profound effect, not only upon the lives of Cato, Varro, and Vergil, but also upon their agricultural treatises.

Marcus Porcius Cato was born in 234 B.C. and died in 149 B.C. Thus his entire life was passed in the period when Rome was extending her dominion, in the West over Carthage, and in the East over Greece and Asia Minor. This was an age of tremendous achievement for Roman imperialism, but
one of sore tribulation for the farming classes of Italy. Widespread devastation of Italian farm-lands by Hannibal, and continuous employment of the farmers in the armies of Rome, had reduced agriculture and the welfare of the agriculturalist to constantly lower levels. But Cato, with that stern tenacity of purpose which characterized his censorship and which kept alive his bitter, deathless hatred of Carthage, wrote down in his *De Agri Cultura* the fruit of his own practical experience, that posterity might read and thereby benefit. In his writing there is no attempt at orderly arrangement, no artificial embellishment of word or phrase, only a series of instructions which are direct, blunt, and brief to a point often approaching obscurity.

The *De Re Rustica* of Varro was written in the decade following the assassination of Julius Caesar, a period in history comparable to the troubled era which Cato knew. Now nearing his eightieth year, Varro had watched the career of Cicero with its tragic ending, the machinations of the First Triumvirate, and from Pompey's camp the long
duel between his master and Caesar. Even as he wrote his contribution to Roman agricultural knowledge we can imagine him pondering the outcome of the increasing enmity between Marc Antony and Octavian. But with the calm detachment of the true philosopher, he could write a lucid and scholarly account of the methods of Roman agriculture despite the political insecurity of his own position and the fact that his life, as he well realized, was nearing its close. His work lacks the blunt forcefulness of Cato's epigrammatic statements, but the studied order in arrangement and treatment of subject matter affords a remarkably clear conception of the agriculture of his period.

Although a much younger man than Varro, Vergil may be regarded as his contemporary, since their agricultural writings were undertaken in the same year - 31 B.C. Their points of view, however, differed widely; whereas Varro's work was purely didactic, Vergil's was motivated by a deeper, less tangible feeling. Realizing full well the havoc wrought upon agriculture by two decades of Civil War, Vergil
felt that the salvation of Roman society lay in a return to the virtues exemplified by life in the country. The task was one which lay near to the poet's heart, for he was himself a man of the country, deeply imbued with a love for his native countryside. Of his love were born the four books of the Georgics, where, in masterly hexameters, Vergil dealt successively with the cultivation of the soil, the care of vineyards, the rearing of flocks and herds, and finally the keeping of bees. Whether or not his work accomplished its intended purpose is now of little consequence; the fact remains that in the Georgics Roman agriculture had found its most eloquent expression.

Owing to the entirely different method of treatment which each of these authors employs, a direct comparison and contrast of their works would be manifestly unfair. Consequently, it seems better to regard Roman agriculture as falling under various headings, and with these divisions of the subject in mind, to form as complete a survey as
possible of the agricultural practices of the Romans.
CHAPTER IV

The Choice of the Farm

The major problem confronting the Roman farmer is still of prime importance to his twentieth century successor. The problem is that of choosing a farm; in making his selection the farmer must take into account an almost bewildering array of related factors. A brief survey of the principal considerations governing the modern farmer's choice will serve as a fitting screen on which to project the advice offered to their contemporaries by Cato, Varro, and Vergil.

The first step in selecting a farm consists in a careful study of the soil; if the land is already cleared and under cultivation, the prospective farmer must consider, first, the quality of the soil, and secondly the treatment which it has received from its former owner. Soil, no matter how rich it may be naturally, cannot be in good condition
if it has been continuously cropped without adequate fertilization. Land which has been let out on lease will bear even closer scrutiny in this connection; many renters operate on the theory of selling all possible produce and restoring a minimum amount of fertilizer to the soil.

Provided, then, that the prospective buyer can assure himself that the soil is naturally fertile and in good "heart", he should next turn his attention to the water supply. If the farm is favoured with a perennial running stream, the problem decreases in importance; such good fortune, however, is rare, and in the great majority of instances, the farm must depend for its water upon subterranean sources. If existing wells or springs ensure a constant and dependable supply, no further information is necessary; but, if wells have to be dug or drilled, the buyer should enquire locally as to the cost of such work, and also the approximate depth of satisfactory wells in the district. If irrigation is necessary, he should take into consideration the adequacy of his
own water supply, or the cost per unit if he intends
to purchase from a privately-owned or community project.
Conversely, if the area is dyked, he must take into
account the additional tax or commitment for this
service and regard it as a fixed overhead charge.

Another important consideration, and one which is frequently overlooked, is the problem
of drainage. If the existing drains are of tile or
cement, and of sufficient capacity to handle the
excess water, the matter may be dismissed without
further thought. If, however, the existing system
depends upon open drains, or upon underground drains
made of wood, the purchaser should estimate closely
the cost of keeping the former in good condition and
of replacing the latter. If a new drainage system
seems advisable, he should observe the slope of the
land, and likewise the facilities for outlets to his
main drains. An accurate chart of the entire drainage
system should be obtained or compiled, and kept for
future reference in case breaks or stoppages occur.

In addition to the above factors,
which primarily concern the land, there are other considerations, equally important, which pertain to the life of the farmer and his family. These, in a general way, are dependent on the neighbourhood. Are the roads good? Are transportation facilities adequate? Are there markets near at hand for the purchase of necessities and the sale of surplus produce? Are churches and schools available? Is there opportunity for social intercourse? Last, but by no means least, is a supply of labour available in the rush seasons?

The above are, briefly, the points to be considered in the purchase of a farm already in production. If, on the other hand, the purchaser prefers to buy virgin land and clear it himself, further details must be taken into account. He must form as close an estimate as possible of land-clearing costs, costs which will be determined by the nature and density of the overgrowth, the stumps and large rocks to be removed and the value of the land when finally cleared. Against this cost he should balance the value of the timber when removed, either as lumber
or as fuel.

Turning now to a study of these points in our Roman authors, it will be found that a phenomenal number of these considerations are dealt with in their writings. Cato's instructions concerning the purchase of a farm are brief, but cogent.

When you are considering the purchase of a farm, keep this in mind - that you do not buy rashly, that you do not stint your efforts in examining (the land), and that you do not consider it enough to go over the land once only. The more you visit a farm, provided it be a good one, the more it will delight you.

This advice might well be tendered to a farmer of the twentieth century. He continues,

Observe how the neighbours fare; in a good district they should fare well ... The district should have a good climate, one not subject to damaging storms; the soil should be rich and naturally fertile. If possible, the farm should lie at the foot of a mountain, facing the south, in a healthful location; there should be a good supply of workmen available. The farm should be well-watered, and near a prosperous town, or the sea, or a navigable river, or a good, much-used highway.

The last sentence quoted shows particularly how fully

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1. Cato, De Agri Cultura, 1, ad. init.
Cato realized the necessity for good markets and for adequate systems of transportation.

In the *De Re Rustica*, Varro echoes Cato's instructions, and treats of them in considerably more detail. An early statement, which Varro attributes to Fundanius, is especially worthy of notice.

Italians seem to have two considerations particularly in mind in farming - whether the land will yield a fair return for the expense and labour, and whether the location is healthful or not. If either one or the other is lacking, and he is determined to farm (such land) in spite of this, he should be taken in hand by his relatives. For no sane man should desire to incur the cost and expense of such cultivation if he sees that it cannot be regained, or even if a crop can be produced, that it will be destroyed by the 'pestilentia' of the locality.

By the term "pestilentia", Varro probably refers to blight or disease arising from foul moisture or air conditions engendered by a low-lying or swampy district. Continuing with the same theme, Varro states that, even if the land is rich, if the region is unhealthful, misfortune prevents the farmer from obtaining his profit, and endangers, not only his profit, but his

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2. Ibid, ix. cf. also, I, iv, 3.
life as well. With these injunctions in mind, Varro thus summarizes his conception of the ideal location for a farm.

A lowland district, sloping regularly in one direction, is preferable to one which is perfectly level, for the latter has no outfall for the water and becomes swampy. The most unfavourable site of all is one which is irregular in conformation, for it becomes 'sour' owing to stagnant pools.

The natural inference from this statement is that land of an even slope presents a relatively simple drainage problem, even as in the present day.

With regard to the soil of the farm, Varro draws attention to the ever-important fact that the nature and type of the soil determine what crops shall be produced. He comments,

All crops cannot be successfully raised on the same land. Just as one variety of soil is suited to the vine, and another to grain, so each of the other varieties is suited to one particular crop.

Vergil uses almost the same words, supporting his statement with references to the produce of India, Pontus, and Epirus. In other words, one may summarize

2. Ibid, vii, 5 and 6.
their advice by saying that the successful farmer will adapt his crops to the capabilities of his farm, or conversely, choose his farm with an eye to the crops which he desires to produce. It need hardly be pointed out that the wisdom of this advice has not diminished in twenty centuries.

In his observations concerning the surroundings of the farm, that is, the neighbourhood in which the farm is located, Varro might almost be a contemporary agricultural writer. Are conditions on neighbouring farms, he asks, such as to benefit or injure our land? Are the transportation systems, roads and rivers, adequate? Are there markets from which necessities may be purchased, and at which farm produce may be sold? Are there in the district physicians, fullers, workmen, who may be called in when required? All these are considerations, he concludes, which are deserving of careful thought before the farm is purchased.

The forethought which Cato and Varro

enjoin upon the prospective buyer of a farm proves that each of these authors realized that there are two principal factors to be considered - first, the ability of the farm to produce revenue, and secondly the desirability of the neighbourhood as a place in which to live. Even after the lapse of two thousand years, it is safe to say that these two considerations should still be the governing factors in the selection of a farm, and that the modern farmer would be well advised to keep the advice of Cato and Varro clearly in mind when making his purchase.
CHAPTER V

The Equipment of the Roman Farm

In view of the emphasis which both Cato and Varro place upon the selection of the farm, one might be inclined to assume that other departments of farm management were subordinate to this main problem. Such a conception has a basis in fact, since the soil of the farm directly determines the nature and variety of the produce. As the experienced farmer has always realized, however, the natural fertility of the soil must be made effective by careful and thorough cultivation. To accomplish this objective, certain tools and implements are essential; their number and variety will depend, first upon the nature of the crops produced and secondly upon the area of the farm. Under the general heading of "farm equipment" must be included not only "tools of cultivation" but also housing accommodation for the farmer and his workmen; barns for livestock, storage sheds, and
facilities for storing the crops until sold or used on the farm. In a general way, a farm should have sufficient tools and implements to handle the farm-work adequately, and sufficient storage facilities to house all the produce. A shortage in either respect will spell, first, inability to take advantage of favourable soil or weather conditions, and secondly an inability to protect the produce from inclement weather. Conversely, too extensive equipment will mean increased capital expenditure and consequent reduced returns upon the money invested. Cato remarks, in a brief but pertinent statement,

Little profit will be left if the farm be over-extravagant.

Although he intends to formulate a general principle, his statement is particularly applicable to the purchase of implements and the construction of the farm buildings.

At the outset two points on which Roman terminology differs from our modern usage should be noted. These are, first the denotation of the

term "equipment" and secondly the meaning of the word "villa" as used by Cato and Varro. The term equipment in modern parlance applies to inanimate objects only, whereas our Roman authors include under this title all the workmen necessary to carry out the farm work. This conception, strange as it may seem to us, becomes natural when one recalls that the work was performed almost entirely by slave labour.

The word "villa" as used in the modern sense, applies to a house or home in the country. To the Roman, however a villa meant the entire group of buildings on the farm. These were not separated from one another as on farms of the present day, but were all grouped together about a central courtyard - a convenient arrangement, and one well-adapted to defence, should the necessity arise. The villa was, in many instances, surrounded by a fence; of such fences there were several types, each of which Varro describes in the following detailed manner.

There are four types of defences, the first, natural, the second, rustic, the third, military, and the fourth, masonry. The first type, the natural, is a hedge planted with saplings or thorn bushes; it has roots and is alive and consequently does not fear the blazing torch of the wanton passer-by. The second type, the rustic, is also of wood, but is not alive; it is made of stakes planted thickly and interwoven with saplings, or of posts with holes bored through, and through the holes rails running lengthwise; or it may be made of trimmed trees with the branches driven into the ground, the trees being placed end to end. The third type of fence is the military enclosure, namely a trench and bank of earth. The trench is adequate only if it can hold all the rain that falls or has sufficient slope that the water will run away. The bank is most satisfactory if it is set close to the ditch and on the inner side of it, or steep enough that it cannot be climbed easily. This type of fence is usually constructed along the public roads or along streams ... Banks without ditches are called walls. The fourth type of fence is a masonry wall of which there are four general types - stone, burned brick, sun-baked brick, or earth and stone.

A fence of any of the above types may also be used to enclose the whole farm, or else the boundaries may be secured by planting trees; a careful marking of the boundaries, Varro observes, will prevent quarrels and law-suits. Neither he nor Cato makes any suggestion

regarding the distribution of the expense entailed in constructing boundary fences; possibly, as in modern practice, the expense was shared equally by the two owners affected.

In determining the necessary amount of equipment, Cato selects two farms, one of 240 iugera, the second of 100 iugera, as the bases for his calculations. It is worthy of note that the very detailed instructions he gives with respect to the first farm presuppose that the main crop shall be olives.

For an oliveyard of 240 iugera, he advises, the following equipment is necessary: a farm manager, a housekeeper, five workmen, three teamsters, one mule-driver, one swineherd, one shepherd - 13 men in total; 3 yoke of oxen, 3 mules for hauling manure, one mill-ass, and 100 sheep; five oil-pressing machines, one copper vessel holding 180 gallons, complete with a copper top, 3 iron hooks, 3 water-vessels, 2 funnels, 1 copper vessel holding 30 gallons, with a copper cover, 3 hooks, 1 small bowl, 2 oil-jars, 1 jar holding fifty gallons, 3 ladles, 1 water bucket, 1 basin, 1 small pot, 1 ewer, 1 platter, 1 watering-can, 1 ladle, 1 candlestick, 1 pint measure, 3 large carts, 6 ploughs complete with shares, 3 yokes complete with traces, 6 sets of harness for the oxen, 1 harrow.

1. A iugerum is 28,800 square feet, approximately 2/3 of an acre.
2. Cato, De Agri Cultura, X.
7 manure-baskets, 3 small vessels, 3 blanket-pads for the mules; the iron tools required are as follows - 8 iron forks, 8 hoes, 4 spades, 5 shovels, 2 rakes with four teeth, 8 scythes, 5 bill-hooks, 5 pruning hooks, 3 axes, 3 wedges, 1 hand-mill, 1 set of fire tongs, 1 fire-rake, 2 braziers, 100 oil vessels, 12 vats, 10 vessels to hold grape-pulp, 10 for amurca, 10 wine-jars, 20 containers for grain, 1 container for lupine, 10 preserving jars, 1 bath tub, 1 wash tub, 2 hand basins, covers for jars and vessels, 1 donkey mill, 1 hand mill, 1 Spanish mill, 3 collars, 1 wooden tray, 2 copper disks, 2 tables, 3 large benches, 1 bench for the bedroom, 3 footstools, 4 chairs, 2 sofas, 1 couch for the bedroom, 4 hammocks, 3 bunks, 1 wooden mortar, 1 fuller's mortar, 1 clothes loom, 2 mortars, 1 pestle for crushing beans, 1 for grain, 1 for seed, 1 for nuts, 1 peck measure, 1 half-peck measure, 8 mattresses, 8 covers, 16 cushions, 10 table covers, 3 towels, 6 hoods for the workmen.

All this varied equipment is necessary, declares Cato, for the life and work of the farm.

For the vineyard of one hundred iugera, Cato lists the following equipment as necessary -

1 farm manager, 1 housekeeper, 10 labourers, 1 teamster, 1 mule driver, 1 willow-worker, 1 swineherd, a total of 16 persons; 2 oxen, 2 donkeys for farm work, 1 for the mill; 3 presses, vats with a capacity to contain five vintages of 96,000 gallons, 20 vats for grape pulp, 20 to hold grain, with tops and covers for each, 6 vessels covered with Spanish

1. Amurca - the watery residue left after the oil had been extracted from the olives. For a full discussion of its uses see Chapter XII.
broom, 4 six-gallon jars, 2 funnels, 3 strainers, 3 extra strainers for removing the flower, 10 vessels for the juices; 2 carts, 2 ploughs, 1 wagon-yoke, 1 yoke for carrying grapes, 1 donkey-yoke, 1 copper disk, 1 set of harness for the mill, 1 copper vessel to hold 120 gallons; 1 watering-can, 3 iron hooks, 1 copper boiler holding 120 gallons, 1 basin, 1 small pot, 1 wash basin, 1 water bucket, 1 ladle, 1 candlestick, 4 beds, 1 bench, 2 tables, 1 wooden tray, 1 clothes chest, 2 clothes closets, 6 long benches, 1 water-wheel, 1 peck measure bound with iron, 1 half-peck measure, 1 washtub, 1 bath tub, 1 vat for lupines, 10 large pots; 2 sets of ox-harness, 3 complete sets of donkey harness, 3 pack saddles, 3 vessels to hold wine dregs, 3 donkey mills, 1 hand mill; the following iron tools are also necessary — 5 brush-hooks, 6 tree-hooks, 3 pruning hooks, 5 axes, 4 wedges, 2 ploughs, 10 forks, 6 spades, 4 shovels, 2 four-toothed rakes, 5 manure baskets; 40 grape-knives, 10 sickles, 2 braziers, 2 sets of tongs, 1 fire rake, 20 Amerine baskets, 40 planting-baskets or troughs, 40 wooden scoop-shovels, 2 wooden trays, 4 mattresses, 4 covers, 6 cushions, 6 table covers, 3 napkins, 6 hoods for the workmen.

In perusing the foregoing list of equipment and furnishings one cannot help but be impressed by Cato's meticulous attention to detail. At first glance, however, it might seem that Cato is inconsistent in his estimate of the number of labourers required on the two farms, inasmuch as he suggests a total of 16 for the 100 iugera farm, and
only 13 for the 240 iugera farm. This apparent discrepancy arises from the fact that the smaller farm is to be devoted entirely to the culture of the vine, a plant which requires constant care and cultivation. The larger farm, on the other hand is to be devoted to olive orchards, which require relatively little care or attention except at harvest-time. On the larger farm, also, Cato advises keeping one hundred sheep; the pasture and meadow land required for their sustenance would naturally curtail the productive area. Consequently, it is clear that Cato is basing his estimate, not upon acreage, but upon the type of crops produced.

Possibly a brief statement made by Varro regarding the number of labourers is as valuable as Cato's minute instructions; he suggests that the owner should observe other farms in his neighbourhood and be guided by their example. Vergil, apparently, found the subject of farm equipment ill-suited to expression in hexameters, for he dismisses

the topic in less than twenty lines, with casual references to "the crooked plough", "the harrow of ponderous weight", and "the slow-moving wains of Ceres, the Eleusinian Mother".

With regard to the buildings of the farm, three factors appear to have been uppermost in the Roman mind. These might be briefly stated as follows: first, the cost of construction; secondly, the relation of the size of the villa to the size of the farm; third, the location of the buildings on the farm. Cato, with his customary emphasis upon detail, has left us minute instructions regarding construction costs and methods; in brief, the owner is to provide timber, stone, lime, sand, water, straw and clay, while the contractor supplies the necessary workmen. This division is interesting in its difference from the modern practice, whereby the contractor, for an inclusive price, supplies both labour and materials of construction. Cato, however, does not regard building as the first duty of the farmer; "when one

1. Cato, Agr. XIV, XV
has reached the age of thirty-six", he advises, "he should build, provided that the farm is completely planted". In other words, the farmer should attend first to the setting out of productive crops, and consider building only when this has been done.

Both Cato and Varro devote considerable attention to the size of the villa. At the outset, the latter makes the following statement:

Many mistakes arise if the measurement of the farm is not carefully observed, for some build the villa too small in proportion to the size of the farm, others too large, either of which reacts against the farm and the revenue therefrom.

The import of this remark is quite clear; buildings too large are over-expensive; buildings which are too small do not contain sufficient storage-space to house all the crops, implements, and general equipment of the farm. To the blanket statement quoted above, Varro adds that the nature of the crops will

   cf. also, Cato, Agr. III, 1 ad fin., 2.
   "Ita aedifices, ne villa fundum quaerat, neve fundus villam."
necessitate a variation in the type of buildings constructed, inasmuch as a grain farm will require large granaries, a vineyard, extensive wine cellars, etc. Cato makes the further suggestion that the farmer have well-constructed buildings, oil-cells, granary and a plentiful supply of storage vessels for oil and wine, in order that he may hold his produce for a good market; this will enhance his profit, his efficiency and his good name. Barns for cattle, he adds, should be strongly built in every detail, with racks above the mangers in which hay may be placed; the presence of such racks will prevent the cattle from wasting food by trampling it underfoot. To the uninitiated, this latter item may seem of trifling importance; it is attention to just such details, however, which characterizes the successful farmer.

In choosing a location for the farm buildings, Cato merely remarks that they should be "well-situated". Varro, however, amplifies this

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2. Ibid, IV, 1, ad init.
3. Ibid, IV, in med.
statement considerably. The water-supply, he insists, should be carefully considered, both with respect to quantity and location. Secondly, the dwelling-house should be placed, if possible, on a hill-top, presumably for the sake of dryness and easy drainage. Barns for the cattle and sheep should be placed preferably at the foot of a wooded hill, facing the most healthful winds of the locality; swamps and river-banks should be avoided as these are not only damp, but subject to plagues of insects and tiny "germs", "which cannot be seen by the eye, but enter the body through the mouth and nose and bring about serious illnesses". Buildings, he adds, which lie in depressions are also subject to floods and to attacks by robber-bands. Care must be taken to ensure that the cattle-barns will be warm in winter and that storage sheds are dry and warm. As an aid to dryness, Cato suggests a plaster, which can be made as

2. Ibid, I, xiii, 7 ad fin. By "villa" in this instance, Varro is referring to the master's house, not the quarters for the slaves.
3. Ibid, I, xii.
follows:

Pour amurca over earth as chalky or reddish as possible, and add straw-chaff; let it steep for four days, then mix it well with a spade. Then plaster (the walls) with it. Moisture will not harm this coating, nor will mice make holes therein, no weeds will grow in it, nor will it crack.

When one compares the minute instructions formulated by Cato for the working equipment of the farm with the somewhat vague instructions regarding the dwelling, he cannot fail to observe that the operation of the farm was considered of infinitely greater importance than the comforts of living. In fact, Varro caustically compares the "luxury" of his own age with the thrift of the ancients, among whom he would undoubtedly include Cato.

A farm is more profitable, he warns, if you construct your buildings in accordance with the thriftiness of our ancestors rather than in accordance with the luxury of the present day; they built with an eye to the requirements of their crops, we, with an eye to our own unbridled extravagance.

It is perhaps comforting to notice that two thousand years ago, even as at the present time, men regretted the passing of the "good old days", and sadly pondered the fate of their contemporary decadent generation.
CHAPTER VI

The Major Crops of Roman Agriculture and their Production

To the average Canadian, imbued with the economic importance of the Prairie provinces, it would appear that wheat, and to a lesser extent other varieties of grain, is the major product of agricultural activity. In considering Roman agriculture, however, one must orient his mind to an entirely different point of view; in the early days of the Republic it is true that grain was a crop of major importance, but during the third and second centuries B.C. the extension of Roman dominion to include Sicily and North Africa brought about a revolution in farming on the Italian peninsula. Grain could now be imported from the new territories at prices ruinous to its production at home. How, then, did the Roman farmer meet this challenge? What may we consider the major products of Roman agriculture?
To both these questions Cato replies in no uncertain terms.

If you should enquire of me as to what type of farm is best, I would answer thus. A vineyard is of foremost importance, provided it produces wine of a good quality, secondly, an irrigated garden, third, a willow-plantation, fourth, an olive grove, fifth, meadow land, sixth, grain land, seventh, forest land, eighth, an orchard upon which vines may be trained, ninth, a forest-grove producing acorns.

Varro, however, points out that Cato's choice is by no means universal, and that some authorities regard meadow-land as of prime importance, feeling that the cost of maintaining a vineyard is excessive in comparison with the returns. In fairness to Cato, however, too much significance must not be attached to the discrepancy between his opinion and that of Varro, as a century and a half had elapsed since Cato's writing, during which time prices, and markets also, would have undergone inevitable changes.

So thorough a knowledge does Cato display of the inter-relation of soil and crop, so

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2. Varro, R.R. I, vii, 9, 10, and I, viii, 1 ad init.
sound is his advice even at the present day, that it seems advisable to quote his suggestions in full.

Where the land is heavy, fertile and free of trees, there grain should be sown. The same land, if subject to fog and mist, can be most profitably sown to rape, turnips, millet, or Italian panic-grass. In rich, warm soil plant olives,—the long olive, the Sallentine, the Coliminian, and the white; plant the variety which is said to flourish best in that locality ... Land which faces the west and is open to the sun is best for olives. Land which is colder and less fertile should be planted with Licinian olives. If you plant (this variety) in warm, rich soil, the produce will be valueless, the tree will exhaust itself by producing, and an injurious red scab will develop. Around the edges of the farm and along the roadways plant elms and poplars, which will furnish leafage for oxen and cattle, and also lumber, should you require it. On river-banks and in damp spots plant shoots of poplar and a reed-bed.

Take careful note of the following in deciding where to plant your vineyard. In soil which is said to be the best-suited to vine culture and lies open to the sun, plant the small Aminian, the double Eugenium and the small mottled variety. Soil which is rich or more subject to fogs should be planted with the larger Aminian grape, the Murgentian, the Apician and the Lucanian. Other varieties, and especially the hybrids, suit any land at all.

1. Cato, Agr. VI, 1, 2, 3, 4.
2. Ibid, VI, 4, ad fin.
It is of great advantage for the farm to have a wood-lot, so that firewood can be sold or used by the master. On the same farm, all possible crops should be planted, including several kinds of grapes - the small and the larger Aminian, and the Apician. All types of fruit should be planted or grafted - apples, Scantian and Quirinian quinces, and likewise other varieties for preserving, and pomegranates, as well as several varieties of pears... Plant mariscan figs in chalky, loose-textured soil, and in richer, heavily-manured soil plant the African, Herculanean, Saguntine, black Tellanian and winter figs. Seed down a meadow, well-watered if possible, if not, a dry meadow, in order to have fodder for your cattle. Close to a city, too, make sure you plant a garden with all kinds of vegetables and with flowers for making garlands, megarian bulbs, several varieties of myrtle, Delphian, Cyprian, and wild laurel, Abellan, Praenestine and Greek nuts. A suburban farm, particularly if this be the only one you have, should be planted as carefully as possible.

Lupine will fare well in soil that is reddish, dark-coloured, or hard, or poor, or sandy, provided only that it is not wet. Spelt should be sown preferably in soil that is chalky or marshy or reddish, provided it is damp. In places that are dry, free from weeds, and exposed to the sun, wheat should be sown. Plant beans in soil that is rich and protected from storms. Vetch and fenugreek must be sown where there are as few weeds as possible; winter wheat does best on a high open location where the sun shines longest. Lentils should be sown on land that is reddish and unfertile.

1. Cato, Agr. VII.
barley on virgin soil that does not lie fallow. 'Three-month' or spring wheat should be planted where winter wheat will not come to maturity, or where the soil, owing to its fertility, does not need to lie fallow. Rape, turnips and radishes must be sown on well-manured or naturally fertile land.¹

Varro's remarks concerning the choice of crop for a certain type of soil² follow the same general trend as the more detailed instructions of Cato. In fact, he actually acknowledges in several instances that his suggestions are based on those of Cato, an admission which is ample proof of the soundness of Cato's advice and an indication that the latter's precepts had stood the test of time. A brief résumé of Varro's comments will suffice to illustrate the close resemblance between his advice and that of Cato. Some places, he says, are suited to hay, others to vines, still others to olives, etc. As a general rule plants requiring a large amount of nutrition should be planted in rich soil; those whose wants are more easily supplied should be sown in the

¹ Cato, Agr. XXXIV and XXXV.
² Varro, R. R. I, xxiv, 1, 3, 4 and I, xxv.
³ Ibid, I, xxiii, 1 ad fin., 2, 3, 4, 5, 6.
poorer soils. Rich, heavy, treeless soil, he continues, is best for grain; warm, rich soil is best adapted to the culture of olives. Vergil, also, notes the fact that all crops do not require the same soil and weather conditions, with this admonition,

Before we cut an unknown plain with our plough, we should take care to learn beforehand the winds and the changeful temper of the sky, and what crops and what manner of cultivation are native to the locality, what each district produces, and what each refuses. Here crops of corn, there vines grow more abundantly, in other places the young growth of trees, and still elsewhere grasses grow strong spontaneously.

In view of the importance attached by Cato, Varro, and Vergil to the cultivation of the vine, it seems necessary to consider this major crop in more detail. The following is a résumé of Vergil's instructions regarding the care of the vineyard. In the first place, he says, the farmer should consider whether he will establish his vineyard upon the plain or on a gentle hill-slope. If in the former position, the vines may be planted more thickly, but in either case they should be so placed as to permit each plant

a maximum of air and sunshine. The young plants should not be intrenched too deeply; from this precept we may infer that the vine, in contradistinction to plant forms of larger growth, is a surface-feeder. If located on a hillside, the vineyard must not slope towards the west - evidently because a vineyard so situated will receive the sun in the afternoon only. Slips or cuttings taken from the lower part of the old vine will make better growth than those obtained from the upper branches; furthermore, such cuttings must be taken with a sharp knife, as blunt steel will bruise the tender shoots. New plants, he continues, should never be set out in the vineyard in winter, for at that time the ground is frozen and the young slip will be unable to strike its roots in the chilly soil; the proper time for planting is the early spring, or if pressure of work at that time should prevent, the early autumn will usually prove satis-

1. Mr. H. Parker, who has experimented extensively with vines on his Brentwood farm in Saanich, B.C., states that a vine will strike lower roots in a soft subsoil, but nevertheless derives its nourishment from the roots closer to the surface.
factory. Close to the new plants, strong stakes should be placed, on which the growing vines may find support. Cultivation must be careful and continuous. No pruning, however, should be permitted, until the vines are well-grown, nor should animals be allowed to approach them. Goats, in particular, must be rigorously kept away, as the bite of these animals is fatal to the vine.

For no other reason, concludes Vergil, is the goat sacrificed to Bacchus on every altar.

To these instructions of Vergil, Cato furnishes additional information regarding the care of the vineyard. The vines, he suggests, should be trained to grow as straight up as possible, but, in tying them, care must be taken that the thongs used do not constrict or "choke" the plant. At seed-time the soil around the vines should be


"Sic factum ut Libero patri, repertori vitis, hirci immolarentur, proinde ut capite darent poenas; contra ut Minervae caprini generis nihil immolarent propter oleam, quod eam quam laeserit fieri dicunt sterilem; eius enim salivam esse fructulis venenum."

2. Cato, Agr. XXXIII.
"trenched", and thoroughly cultivated. If the soil is poor, manure, straw, or grape-dregs should be placed around the roots to supply additional nourishment. Leaves should be thinned at intervals and stripped off completely towards harvest-time to permit even ripening of the fruit. Varro has little to say regarding the actual cultivation of the vine, but he devotes considerable attention to the stakes used in supporting the plants. Various types of stakes may be used, he suggests, either those which will carry the vine vertically to its full height, or those which will carry it vertically to the height of a man, then laterally to care for the remainder of the growth. Another method suggested by Varro consists in planting the vines in the tree plantation, where they will find support on the spreading branches of the trees. This latter method, so frequently mentioned in Roman literature, is known as "wedding", that is, uniting the vine with the branches of the supporting tree. With all the above

2. Ibid, I, viii, 3, ad fin.
advice in mind, one is compelled to admit that Varro, in criticizing the expense involved in maintaining a vineyard, had some basis at least for his comment.

The olive, by comparison with the vine, required very little care. It is Vergil's opinion that "soil which is hard to work and hills that grudge to yield, and thin clay, and gravel in shrubby fields, all these rejoice Athene's wood of the long-lived olive".

Olives, he continues, require no culture, nor do they desire the crooked pruning hook nor the clinging harrows, when once they have taken root in the fields and attained the air.

Cato, however, suggests that it is advisable to cultivate around the roots of the olive-trees each month until they are three years old, but after that time an occasional light ploughing is sufficient.

From the foregoing survey it is clear that the Roman farmer thoroughly understood the care of these, his major crops. Consequently, it is

not surprising to find that the same faculty of careful observation gave him a clear understanding of the various ways in which plants are propagated.

In discussing this subject, Vergil divides propagation into two main classes; first, that effected by natural methods, and secondly that effected by artificial or "man-made" methods. Under the heading of natural growth Vergil includes the plants which appear to rise spontaneously from the ground such as the broom, poplar and willow; secondly those which deposit their own seed on the ground and finally those which, like the cherry, plum, and apple, send up from the ground, "an ample forest of suckers". Under artificial methods, Vergil mentions the transplanting of suckers from the parent tree, the direct planting of cuttings or "slips", the use of grafts, and the process of "layering", whereby a branch or shoot is placed in the soil while still connected with the parent bush; if carefully watered and cultivated a shoot so placed will eventually strike new roots of its own. Returning

2. Ibid, II, 17, "ab radice ... densissima silva".
to the subject of grafting, Vergil is probably more poetical than practical when he speaks of its possibilities,—

the beech has whitened with the blossom of the chestnut, the mountain-ash with the snowy bloom of the pear, and swine have broken the acorn beneath the elm.

Varro, however, adds the caution that cultivated fruits should be grafted only on cultivated trees if the farmer wishes to retain the quality of the fruit unimpaired.

Varro's remarks on the subject of plant-propagation follow the same general trend as those of Vergil; like Vergil, he recognizes two general divisions of plant-growth, namely, natural and artificial. Under the heading of natural methods he includes all plant forms which rise from seed; artificial methods he subdivides into three subsections, namely the use of suckers, of cuttings and of grafts. In general, he says, slow-growing varieties,

of which the olive was the classic example, or those
which, like the fig, produce a very small seed, can
be grown more readily from cuttings than from seed.
Early in the spring, before there is any sign of a
bud, cuttings should be removed from the strongest
and healthiest branches and placed at once in the
nursery in soil as similar as possible to that to
which they will finally be transplanted. The
importance of having the soil of the nursery resemble
that of the field where the final planting will be
made is emphasized also by Vergil and Cato. Vergil
remarks:

Those men whom no vigilance escapes seek out
in advance a place where first the crop may
be prepared for the supporting trees, like
in character to that wherein it is to be
planted when carried out, lest the young
plants should fail to recognize a mother
suddenly changed.

Less poetically, but quite as emphatically, Cato
offers similar advice.

Make a nursery in the following manner.
Select the best, the most open and the most
heavily manured land you have, where the

2. Cato, Agr. XLVI.
soil is as similar as possible to that where you intend to transplant, and so situated that the young plants will not have to be carried too far from the nursery to the field.

As a further detail regarding the nursery, Cato advises that the slips be planted eighteen inches apart in each direction and that they be permitted to project about an inch above the ground; also, growth will be more rapid if the hoe is kept busy.

Although Varro discusses the subject of grafting, his remarks are inclined to be sketchy, and it is to Cato that we must turn for a detailed treatment of this science.

Graft olives, figs, pears, and apples, he advises, according to the following method. Cut the end of the branch where you intend to make the graft a little on the angle so that the water will run off; while you are making the cut, take care that you do not bruise the bark. Then take a hard stick, sharpen it, and also split a Greek willow. Mix chalk or clay, some sand, and cattle manure and make the mixture as sticky as possible. Take the split willow and bind it around the cut branch, so that the bark will not split. When you have done this,

1. Cato, Agr. XLVI, ad fin.
drive the sharpened stick between the bark and the sap-wood to a depth of two fingers. Then take a scion of whatever variety you wish to graft, sharpen it slightly on the angle for a distance of two fingers; take out the dry stick which you drove in previously, and in its place insert the scion which you wish to graft. Drive it in to the edge of the sloped cut, until bark fits to bark. By the same method you may make a second, third, or even fourth graft ... Finally, wrap carefully with straw and bind it carefully to prevent injury by frost.

This method, it may be noted, is still extensively used by horticulturists, who refer to the process as "Crown" or "Rind" grafting. Cato speaks also of grafting by the process now known as "budding", whereby a section of bark is removed from a branch and a section of bark containing a bud from another tree is fitted accurately in its place. Either of these methods may be carried out at three seasons of the year, namely, in the early spring, for fifty days, at the summer solstice, and during the vintage. For olive and fig-grafting, however, Cato recommends the early spring.

1. Cato, Agr. XLII.
For grafting vines, Cato outlines three methods. In the first method, a strong branch is cut off at right angles and across the face of the cut a wedge-shaped incision is made to the full extent of the diameter; in this incision a scion sharpened to fit exactly is placed and bound firmly in position. Presumably he intends this method, known in modern horticulture as "cleft-grafting", to be used when both stock and scion are of approximately the same size. A second method which may be employed when the vines are growing close together, Cato describes as follows:

Cut the end of a young shoot of each of two vines on the angle, binding the shoots pith to pith.

This method is known in modern horticulture as "side-grafting" or more generally as "inarching". The most frequent present-day use of inarching is to improve the symmetry of ornamental trees or shrubs, for by bending back a superfluous branch until it touches the trunk, a union will ultimately be established at

2. Ibid, XLI, 2, ad fin.
the point of contact; when the fibres are firmly "knitted", the branch is cut off below the union. A third method described by Cato consists in boring a hole completely through a low-growing branch, and placing in the incision two scions cut obliquely and fitted together. The branch is then bent down to the earth and covered with soil at the point where the graft has been made. To this process there seems to be no direct modern counterpart; Cato himself makes no comment as to the efficacy of this method of grafting, but it could hardly have been very successful as the cambium layer of the scions did not come into direct contact with that of the stock.

In addition to the above methods of grafting, Cato describes two other means of artificial propagation, both of which are directed to causing a branch or sucker to strike roots of its own while still united to the parent stem. The first method he describes as follows:

Press down into the ground the suckers

2. Ibid, XI; cf. also, CXIII, 1, 2.
which arise from the earth at the foot of the tree, raising the tip of the shoot from the ground so that it (the shoot) will take root. After two years dig it up and transplant.

Or, he suggests, for more careful layering, the scion may be passed through a basket filled with soil in which roots will eventually form; when the shoot is transplanted, the basket should be left in position. This method is still used by modern experts, but with two improvements. At the point where the new roots should develop, the stem is either "tongued" (i.e. cut longitudinally to arrest the flow of returning sap) or the bark is "ringed" to accomplish the same purpose. Also, it is now customary to fasten the shoot underground with a wooden staple to prevent it from being accidentally dislodged. Cato also describes a method of layering a branch higher up on the tree, by surrounding the branch with a basket of soil and leaving it in this position until roots have been struck, a process requiring two years. This method, called in modern practice "circumposition", is still

2. Ibid, CXXXIII, 3.
widely used, but again the branch is "tongued" or "ringed" as in the case of ground-layering.

As a natural sequel to the grafting and layering of young plants, Cato gives brief but clear-cut instructions with regard to transplanting. All young plants, when of an age to be placed in field or vineyard, should be dug up carefully with as much soil around the roots as possible, to prevent tearing or otherwise damaging the delicate root-hairs. Transplanting should never be attempted in windy or stormy weather. When placed in trenches previously prepared to receive them, the plants should be covered with fine top soil packed down tightly to prevent escape of moisture and to give the young roots a chance to make growth immediately in their new surroundings. To these specific instructions modern horticultural science has little to add.

Although Varro offers but little information with regard to grafting and layering, his advice on the subject of field-crops is accurate,

1. Cato, Agr. XXVIII.
detailed, and worthy of the most careful consideration. Turning his attention first to the amount of seed required per unit of area, he advises that beans be planted four modii to the iugerum, wheat five, barley six, spelt ten and alfalfa one. Reducing these amounts to modern terms we find that his estimate is three bushels per acre for beans, three and three-quarters for wheat, three and one-half for barley, seven and one-half for spelt and one and one-half for alfalfa. These amounts, with the exception of that recommended for alfalfa, correspond very closely to those sown on a modern farm. The yield per acre on a Roman farm, however, must have been somewhat less than that considered an average crop on the present-day farm, as improved methods of seed-selection and cultivation have materially increased yields, even

2. A modius is equivalent to 1 peck, dry measure.
3. Examples of an average modern sowing are as follows: wheat (fall) 2 bushels per acre; wheat (spring) 2½-3 bushels; barley 3 bushels; alfalfa 15 lbs. if sown broadcast, 9 lbs. if drilled in rows. Varro's suggestion of 1½ bushels per acre (90 lbs.) for alfalfa is quite impossible of explanation, unless the germination ratio was exceedingly low.
within the last fifty years. Varro, however, makes 1
the stipulation that the amount of seed may be varied
to some extent; on poor land a lighter sowing is
preferable, while on rich land or land that has lain
fallow during the previous year a heavier sowing
will not be detrimental. About rotation of crops
Varro offers no information, but Vergil supplies a
2 little of a very general nature.

You will also allow your lands to rest after
being cut, and the field to harden by
inactivity. Or, in different seasons, you
will sow the golden wheat whence you have
reaped the joyous pulse with rattling pods or
the slender offspring of the vetch and the
fragile stalks of the bitter lupine with
its rustling growth. Crops of flax burn
the land, and likewise oats, and so, too,
poppies, laden with Lethaean sleep. But
the toil (of the ground) is made easy by
changing the crops, provided it shame you
not to load the ground with rich manure
and to scatter ashes upon the wearied lands.
Thus, too, the land will rest by a change
of crops, nor will there be meanwhile the
barrenness of untitled ground.

This passage is illuminating inasmuch as it shows,
not only a conception of the necessity for fertilization,
but also some conception of the fact that continuously

growing the same crop on a piece of land is injurious to the welfare of the soil.

As a fitting conclusion to his remarks on crop cultivation Varro describes in detail the accepted Roman methods of harvesting the crops and the storage thereof. Cato's advice, while more technical and imperfectly organized, nevertheless furnishes additional information, particularly with regard to harvesting when done by contract. Varro speaks first of hay crops, secondly of grain, thirdly of the vineyard and finally of fruits, with particular reference to the olive.

With regard to hay crops, Varro's advice may seem brief and inadequate, but it must be remembered that this crop presents infinitely less trouble to the farmer than do the other crops which he describes. The grass should be cut, he advises, when it ceases to grow and commences to ripen with

2. In modern farming practice, clover hay, or mixed hay containing clover, is considered ready to cut when the first or top bloom of the clover is just beginning to fade.
the heat. When thoroughly dried, it should be made into bundles and hauled homeward to barn or stack, preferably the former. Cato emphasizes the fact that hay should be cut before the seed ripens, an injunction which suggests that under-ripe hay is preferable to that which is over-ripe. The best hay, he continues, should be stored separately and fed to the oxen during the spring when they are being worked hardest and consequently need the best fodder available. If the hay crop is poor, Cato advises that poplar, elm, and oak leaves will serve as forage for sheep and cattle.

For harvesting grain-crops, Varro suggests three methods of cutting, in which the only variation is the length of straw left on the field. The stubble, apparently, was either cut later to make bedding for the cattle, or was used as pasture. He advises that the best ears be selected

1. Cato, Agr. LIII.
2. Ibid, LIII.
3. Ibid, LIV, 4; cf. also, XXX ad init.
5. Ibid, I, lli ad init.
and threshed separately from the main crop. Vergil, in a parallel passage, emphasizes the need for particular care in the treatment and selection of seed, since all seed has a natural tendency to deteriorate in course of time.

Threshing, to which Varro devotes considerable attention, was carried out by a method which to us seems crude and inefficient. First a threshing floor was constructed of earth, packed hard and treated with oil dregs to prevent saturation by rain and injury to the surface by mice or other vermin. Upon this floor the ears of grain were placed and trampled by oxen to separate the grain from the husks. Finally the grain, chaff and husks were tossed in the air, preferably when a light breeze was blowing; the heavy grain fell back to the ground while the light chaff was carried away by the wind. The grain, Varro recommends, should be stored in a dry granary, elevated above the ground.

to prevent moisture from seeping into it from the soil; furthermore, to protect the grain from mice, the walls of the granary should be coated with a plaster made of chaff and amurca. This latter precaution is also advised by Cato.

With regard to harvesting the grapes, Varro makes the obvious suggestion that early-maturing varieties should be gathered first. During the picking, the farmer should divide the produce, carefully selecting the best fruit for the table. After the grapes have been "trodden", the stalks, pulp, and skins should be placed in the wine press and further juice extracted, which will not be inferior to that yielded by the former process. Pressing may be repeated several times after the skins have been cut into small pieces, but the juice should be kept separate as it will taste of the knife. According to a suggestion made by the frugal Cato, this inferior wine, as well as that made from inferior grapes should be stored away and issued to the farm-

1. Cato, Agr. XCII.
3. Cato, Agr. XXV, XXIII, 2; cf. also LIV ad init., and LVII ad init. cf. also Varro, R.R. I, liv, 3.
labourers during the winter months. Finally, the wine should be placed in jars and allowed to stand while the dregs settle; after each settling the wine should be poured off, and when no further dregs appear, should be sealed and stored away until sold. If the wine has a bad odour, Cato declares it can be improved by the following means:

Thoroughly heat a thick, clean piece of roofing-tile, coat it with pitch, and lower it gently to the bottom of the wine jar. Leave the jar sealed for two days, then remove the tile. If the bad odour has disappeared, well and good; if not, repeat the treatment.

In his instructions regarding the olive harvest, Varro emphasizes the fact that the fruit should be picked by hand rather than shaken from the trees or beaten off with sticks, as a bruised olive dries out rapidly and consequently yields less oil. The fruit should be conveyed immediately to the pressing-room and placed in piles to mellow; caution must be observed, however, for if left too long in the piles, the olives will spoil with the

1. Cato, Agr. CX.
heat and turn rancid. This point Cato also emphasizes, and suggests that it is advantageous to have two complete pressing equipments so that the oil may be extracted at exactly the right moment. After the pressing is completed, the best oil should be carefully skimmed off the vessels in which it has been placed, and stored in a cool place until marketed. The watery residue, known as "amurca", which remains after the skimming process should be stored and used for a wide variety of purposes which will be considered in detail later.

Lest anyone should think that the farmer's labours were over at the conclusion of the vintage and the harvest, both Cato and Varro insist that work must continue throughout the winter. Although Cato conveys this impression by suggestions scattered at random throughout the De Agri Cultura, Varro, more systematically, divides the year into

2. Ibid, II, 3; XVII, ad init.; XXIII ad init.; XXXVII, 3; XXXIX.
eight periods, outlining the various tasks to be performed during each period. To the modern farmer, who prides himself upon his systematic organization of the year's work, there is no more interesting passage in the whole realm of Roman agricultural literature than that in which Varro outlines his suggestions for the successful completion of the manifold labours of the farm.

In the first of his eight periods, extending for forty-five days from the rising of the West wind to the spring equinox (February 4 to March 21), Varro advises that young plants should be set out in the nurseries, orchards pruned and trimmed, meadows weeded and manured, and the vineyard cultivated. During the second period, from March 22 to May 4, olives should be planted out, and old olive trees pruned; at the same time crops must be weeded, and willows cut and stored away to be used later in making stakes and baskets. Between May 4 and June 21, that is, during the third period, the vines should

be continuously cultivated, and the leaves thinned out where necessary. All fodder-crops for the stock should be cut — clover, vetch, mixed forage and finally hay. During the fourth period, extending from June 22 to July 18, grain should be harvested and summer-ploughing done, during these days also, provided the ground can be prepared, all leguminous plants (vetch, lentils, peas) should be sown. Cultivation of the vines should also continue. Between July 18 and September 23, stacks should be built if barn space is inadequate, the land ploughed in the former period should be harrowed, and watered meadows cut a second time. Leafage should also be gathered at this time as winter fodder for sheep and cattle. During the sixth period, extending for thirty-one days from September 24 to October 25, crops should be sown; (presumably Varro refers to fall grain, but Cato adds turnips, forage-crops and lupine); grapes must be gathered and the vintage attended to, followed by the pruning of vines and the planting of fruit-trees.

At this time, too, although Varro makes no mention thereof, it would naturally be necessary to harvest the olive crop. In the seventh period, from October 26 to December 21, the work will consist in pruning the vineyard and in general care of the farm—digging and cleaning ditches, repairing fences, and building new ones where required. In the final period, between December 22 and February 4, draining should be continued and pruning of the vineyard completed. If the season is dry and fair, arable land may well be worked; if the weather is bad, various tasks may be carried on indoors. These Varro does not enumerate, but Cato suggests mending clothes, making or repairing harness, cleaning seed, and other routine work in preparation for busy days to come. Considering this formidable outline of work, one cannot wonder at a remark of Cato's:

Make sure you do all tasks at the proper time; it is a characteristic of farming, that, if you do one thing late, you will be late in doing everything.

From a survey of the foregoing, it is evident that the Roman farmer had an amazingly clear conception of the most important phases of farm management - namely, the selection of crops as required by soil conditions, the care of the crops when planted, the harvesting and storage of the produce, and the effective distribution of the year's work. Some of his methods (and one immediately thinks of his method of threshing), may seem to the modern machine-equipped farmer, pitifully inadequate; but we must continually keep in mind the fact that, not alone in agriculture, but in every other industry, machinery was practically unknown two thousand years ago. Consequently, we must appraise the Roman farmer in the light of his period, and tender him due respect for the method and the system which he developed in all his farm work.
CHAPTER VII

The Animals of the Roman Farm

In reviewing the crops produced on the Roman farm, one cannot help but notice that they were of three distinct classes: first, those produced for the table of the master and his household, secondly those produced for direct sale, and finally those produced for consumption by the animals kept on the farm. While the first and second groups mentioned above claim greater attention from our Roman authors, sufficient stress is laid on the third group to indicate that stock-raising formed an integral part of Roman agriculture; consequently it is not surprising to find that Cato, Varro, and Vergil devote considerable attention to the subject of animal husbandry. Cato's remarks, while containing a wealth of practical information, are fragmentary and scattered; Vergil and Varro, however, treat the whole subject systematically, and their advice, together with occasional terse
injunctions offered by Cato, will afford a fairly complete picture of animal husbandry as practised by the Roman farmer.

At the outset Varro lists eight species of farm animals for consideration - sheep, goats, swine, cattle, asses, horses, mules, and dogs. Each of these species he considers under the following nine headings: age at which to purchase, the characteristics to be looked for in each by the prospective buyer, the problems of pasturage, feeding, breeding, and health, the breed, the form of purchase, and finally the number of each which the farmer should possess. It need hardly be pointed out that these same problems confront the rancher of the present day.

In common with other animals, advises Varro, sheep should be purchased when they are full-grown, so that they may produce revenue immediately. They should be of full body, with thick, soft fleece covering the entire body, particularly about the head.

1. Varro, R.R. II, i, 12, ad init.
and neck. The legs should be short, the tail long in Italian breeds, but short in the Syrian. Rams should be full-bodied, with wide chest and shoulders; the tongue should not be black or spotted, as such rams will beget spotted sheep. Care should be taken that the sheep-pen be placed where the wind will not blow too coldly; above all, both pen and pasture must be thoroughly free from dampness, for moisture will not only injure the fleece, but will cause "foot-rot", a disease whose disastrous results are well known even to sheep-raisers of the present day. Pregnant ewes should be kept away from the main flock for obvious reasons; similarly, sheep that develop any trace of sickness should be segregated at once in order to prevent a spread of the contagion. As far as possible, sheep should be grazed during the early morning and late afternoon, but if pasture is short and the flock must be pastured during the heat of the day, the sheep should be headed away from the sun to prevent the dangers of sun-stroke. The best time to breed ewes is at the end of May; the lambs will then
be born in the early fall when new grass is springing up as a result of fall rains. For the first three weeks, the lambs should be permitted to suck two or three times daily, but thereafter they should be gradually weaned, and fed gradually increasing amounts of vetch and tender grass. The total number in the flock will depend upon the pasture available, but one shepherd should not be responsible for more than two hundred sheep. From the standpoint of health, it is better, suggests Varro, to have smaller flocks, as the shepherd can watch them more closely, and disease can be more easily checked. Unfortunately, Varro dismisses the health of sheep with the comment that the shepherd should have written rules for treatment always with him. Vergil, however, supplies the information that cuts and wounds should be treated immediately, particularly those which occur after shearing, when the sheep's body is not protected by its fleece. He also

1. In modern agriculture, farmers are careful to see that the animal being weaned does not receive any set-back at this time. Care in this is necessary for all species and breeds of animals.

suggests that, in case of fever, listlessness, or loss of appetite, the best treatment consists in opening a vein under the foot and drawing off the fever by loss of blood. As a preventive against scab, Cato advises the following treatment,

Take cleaned amurca and water in which lupines have been boiled and dregs of good wine; mix them all together thoroughly. After shearing the sheep, smear the whole body and let the animal sweat for two or three days. Then wash (the sheep) in salt water; if you do all this, they will not have the scab, the wool will be of better quality, and ticks will not bother them.

The prospective goat-keeper should, if at all possible, purchase his entire herd from one farm. He should also pay strict attention to the appearance of those offered him, choosing only those animals which are strong, of good size, with thick smooth hair, and most important of all, displaying a large udder. Like sheep, goats require pens sheltered from the wind, dry, and well floored. In contradistinction to sheep, however, goats may be

2. Cato, *Agr.* XCVI.
pastured on rough hillsides or on meadows clothed
with shrubs and bushes. The female should be bred
in the late fall, so that the kids may be born in
the early spring when forage is plentiful. For the
first three months of their life, the young should be
fed first on their mother's milk, but gradually weaned
and encouraged to nibble vetch and grass. As goats
scatter far and wide while feeding, a herd should not
contain more than fifty head. For breeding purposes,
one buck to fifteen does appears to have been the accep-
ted ratio. With regard to the health of goats, Varro
makes the cryptic comment that he can say nothing
about the health of animals which are never healthy.
Since he does not amplify this remarkable statement,
and since neither Cato nor Vergil offers any enlighten-
ment, it is impossible to derive much meaning from
Varro's complaint.

In speaking of swine, Varro suggests
that their care is a subject well understood by the
Roman farmer. As guides to purchase, he states that

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the best swine are of solid colour, and heavily built in all details except head and feet; also the herd from which purchase is made should be one in which the sows are famous for their productivity. The pastures should be damp, or better still, should contain a stream or pond in which the swine may wallow to their hearts' content. Sows may be bred twice annually, early in the spring and again in the fall, as the period of gestation for these animals is only four months. If, however, a sow produces a poor litter when first bred, it is advisable to dispose of her at once, as the first litter is a sure indication of those to come. While she is feeding her young, the sow should be well fed in order to maintain her own health as well as to provide a plentiful supply of milk for her offspring; consequently, unless pasturage is very plentiful, Varro suggests that from two to four pounds of barley should be fed to the sow daily. For breeding purposes, the ratio should be one boar to ten sows.

Turning his attention to cattle, Varro

gives a very detailed description of the best type
to purchase; it is well, however, to keep in mind
that Varro considered cattle primarily as draught
animals, and not as milk-producers. Cattle, he
advises, should be well-formed, with sturdy limbs,
blackish horns, wide foreheads, large black eyes, a
long, thick neck, body well-ribbed, broad shoulders
and flanks, a heavy tail hanging down to the hocks, and
a skin soft and smooth to the touch. The best pasture
is that which contains not only grass, but also shrubs
and bushes upon which the animals may browse. Cattle
should be bred about the middle of May, so that when
the calf is born a plentiful supply of pasture is
available. When the cow is due to freshen, she should
be carefully handled and fed with the best fodder
available; poor food, or scanty feeding at this period,
will affect adversely both the cow and the unborn
calf. Weaning, as in the case of other animals,
should be effected gradually; as the supply of mother's
milk is decreased, the calf should be fed increasing
quantities of grass and barley meal. Regarding the
health of cattle, Varro merely suggests that the herdsman should be familiar with the diseases to which these animals are subject, and should have with him written rules for treatment. Cato, however, lists a number of remedies, which, while interesting, may be considered of questionable medicinal value.

1

If an ox becomes sick, he advises, give him a raw hen's egg, swallowed whole. Next day, crush a head of leek in wine and make him drink it; administer it from a wooden vessel. Both the ox and the man who administers the remedy should be standing, and both must be fasting.

Another prescription, to be used as a preventive against sickness in cattle is even more remarkable.

2

If you are afraid of sickness, give the oxen the following remedy while they are still in good health: three grains of salt, three laurel leaves, three leek leaves, three sprigs of garlic, three grains of incense, three plants of Sabine grass, three leaves of rue, three sprigs of white vine, three white beans, three live coals, three pints of wine. You must gather, mix and administer all these out in the open, and he who administers the remedy must be fasting. Give each ox a dose for three days, and apportion it in such a way that, when you have administered three doses to each, all has been used.

1. Cato, Agr. LXXI.
2. Ibid, LXX.
The precise effect of this concoction Cato fails to discuss; he does, however, make the very sound
suggestion that the water given to the cattle should be clean and pure.

Continuing with the subject of draught-animals, Varro enjoins that asses should be sturdy, sound in wind and limb, and full-bodied. Their food, in addition to pasture, should consist of barley and spelt. The females, during the latter part of their pregnancy, should be relieved of all hard work; if this advice is followed the offspring will benefit as well as the mother. The young should be permitted to remain with the dam for twelve months, and only broken to harness when they are two years old. With regard to health, Varro makes no comment; thus we may assume that the ass of Roman agriculture was as hardy as his modern progeny.

Roman horses, like those of the present day were of two types,—those used for riding

and those intended as draught animals. As may readily be understood, the two types differed considerably; draught-horses, by comparison with riding horses, were slower, heavier, and less high-spirited. Confining his attention to the former class, Varro advises attention to the following details: a head of moderate size, well-formed limbs, wide nostrils, broad, full chest, broad shoulders, straight legs, a backbone not prominent, and hard hoofs. Mares should be bred to produce the foal in the spring; as the period of gestation for mares is slightly over eleven months, breeding should thus take place between the spring equinox and the summer solstice. The mares should be permitted to suckle their foals for two years; at the end of this time the weaning process should be complete. With reference to the "breaking" of horses, Varro states that this should be done gradually, but only after the colts have reached the age of three

2. According to present-day breeders, the period of gestation for mares varies from 10 to 12 months, 11 months being a generally-recognized average.
years. Their health should be carefully guarded by the groom, to whom both illnesses and treatment must be familiar. From the fact that Varro, in his discourse about points to be observed in purchasing a horse, mentions "veins well-defined all over the body", adding that such a horse is amenable to treatment when ill, we may assume that blood-letting was the accepted panacea for all illnesses of these animals. On the subject of horses, Cato is silent; from his silence we may infer that the horse was not used for farm work at his period, but became fairly common by the time of Varro's writing.

Owing to the fact that mules are the offspring of a horse and an ass, and do not reproduce their own kind, Varro's discussion of these animals is necessarily brief. If possible, a mule when foaled should be fed on mare's milk, which was considered to be more nutritious than that of the ass. Of feed they require less than horses, but of the same type;

1. Varro, R.R., II, vii, 5 ad fin. "toto corpore ut habeat venas, quae animadverti possint, quod qui huius modi sit, cum est aeger, ad medendum appositus."
this fact, it might be pointed out, is the one advantage possessed by the mule. The characteristics to be desired by the buyer are essentially the same as those to be sought for in the purchase of horses.

Upon the subject of dogs, Varro lavishes an amount of care which at first glance seems totally disproportionate. When one remembers, however, that dogs were extensively used, not only as assistants to the herdsmen but also as the guardians of the farm, one must admit that their selection and care would be a matter of considerable moment to the Roman farmer. According to Varro, the following were the characteristics to be closely observed: good size, stubby jaws with fangs projecting left and right, large head, heavy shoulders and neck, wide paws, spongy rather than hard underneath. No dogs should be purchased from huntsmen or butchers, as their former training will lead them to turn all too readily upon the flocks they are intended to guard. Their food should consist of bones

and scraps of cooked meat; raw meat will make them savage. During the three month period of pregnancy, the females should be given barley bread in addition to their other food. From the litter, only the best pups should be chosen for rearing and the rest disposed of; as a result of this culling, those which are left will be better fed by the mother and will develop more rapidly. Both mother and young must be protected from damp and cold. Training in implicit obedience should be begun in earliest infancy, as also should training in fighting, in order that they may become accustomed to their work of guarding the flock. When the dogs are full-grown and trained to their tasks, Varro suggests that a stout leather collar with nails projecting on the outer side should be placed about their necks to guard this vital spot from injury by wild animals. The number of dogs required by the farmer will vary with the number and size of his flocks and herds. Cato makes no mention of shepherd-dogs, but does suggest that

1. Cato, Agr. CXXIV.
watch-dogs be chained during the day and only permitted to go free at night.

To the modern farmer, Varro's advice regarding the selection and care of farm animals contains many suggestions of practical value. One cannot help feeling, however, that Varro's work would have been considerably more valuable if he had devoted more attention to the diseases of animals and their treatment, since his survey is so thorough in all other respects. For this deficiency there may be a good reason; it is universally recognized that the more natural the conditions under which animals live, the healthier they will be. Thus it seems reasonable to assume that disease of flock and herd did not present such a serious problem to the Roman farmer as it does to the present-day agriculturalist. In view of this fact, one cannot censure too strictly Varro's lack of advice on this point; rather should we blame the modern policy of excessive inbreeding.

1. This comment applies particularly to cattle, which are "forced" in order to produce record-breaking quantities of milk and butter-fat.
and overfeeding, which is the root of so many diseases among farm animals at the present day.
If a modern farmer were to read Varro's *De Re Rustica*, his interest would be continuously maintained by the first two books wherein Varro discusses, first, the farm and its cultivation, and secondly, animal husbandry. In the third book, however, his interest might be less marked; here Varro describes the care of poultry, sundry small animals, bees, and finally fish — all of which are branches of husbandry that have either been discarded entirely from modern agriculture or relegated to the domain of specialists. Poultry raising and beekeeping are still important branches of the industry, but the average farmer either considers himself a specialist if he engages in either of these pursuits, or else regards them as rather amusing sidelines to the main business of stock and crops. On the Roman farm, however, not only poultry and bees, but also numerous
smaller birds and animals were profitable and important subjects of attention by the Roman farmer. In these spheres of farm activity Cato makes but little contribution; Vergil, however, devotes his entire Fourth Georgic to the subject of beekeeping, and the sheer poetic beauty of his treatment makes his work as interesting from the point of view of poetic excellence as it is from that of sound, practical advice.

In order to obtain a degree of coherence among the widely diversified topics of his subject, Varro creates a threefold division as a basis for his discussion. First he considers poultry - not merely ducks, geese, and chickens, but also field-fares, pigeons, and peafowl. The second topic he subdivides under three headings; first stags, hares and other animals kept in huge preserves or "warrens" for the delight of the huntsman, secondly dormice and snails, and thirdly the vastly important topic of bees; finally he comments briefly upon the subject of fish - not those existing in the wild state in brook
or stream, but rather those maintained in private ponds in a semi-domesticated condition. So cursory is Varro's treatment of the game preserve and the fishpond, so caustic are many of his remarks that one feels an implication that these were not properly branches of agriculture, but rather the pastime of the idle rich.

In speaking of the various types of poultry on the farm, Varro turns his attention first to fieldfares. The aviary, or bird-house, in which they are raised should be a large domed building, fitted with only as many windows as are necessary to admit light, since the imprisoned birds will mope and pine if permitted to see their more fortunate brethren outside. The building should be plastered inside to prevent the entrance of mice and vermin and well equipped with perches; both floor and perches should be kept scrupulously clean. A few days before marketing, the birds should be removed to a smaller pen and fed increased quantities of grain and figs. Ortolans and

quail, which may also be raised in the aviary, require precisely the same treatment. Peafowl, on the other hand, should not be penned, but permitted to roam the fields for their food; before marketing, the diet should be enriched with barley or other grain. Pigeons should be encouraged to make their homes in individual nests in a building similar to the aviary; again scrupulous cleanliness is to be desired, not merely for the sake of health, but also because the manure of these birds is a most valuable fertilizer. To fatten young pigeons, Cato advises a diet of boiled or roasted beans, followed by a mixture of crushed beans and spelt until the birds are fattened. 

The best hens, says Varro, are distinguished by their reddish colour, black wing-tips, toes of uneven length, upright comb and full body; to these points, therefore, he enjoins careful attention before purchase is made. The hen-house should be

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3. Ibid, I, xxxviii, 1.
4. Cato, Agr. XC.
equipped with perches and should have an enclosed yard in front, in which the hens may exercise and dust themselves. As these birds are particularly subject to lice, all equipment should be cleaned frequently. For setting purposes, Varro advises the use of older hens, as these are less likely to desert the nest; while the hen is sitting, the eggs should be turned every seven days during the three week incubation period so that they will be warmed evenly. For a sitting, Varro recommends the startling figure of twenty-five eggs per hen, which seems an impossible number when compared with the modern practice of setting twelve, or at the most, fifteen. A possible explanation is that eggs were smaller in Varro’s time than they are today. During the first fifteen days of their existence, Varro continues, the baby chicks should be fed a mixture of barley meal and cress seed spread on soft sand, as a hard floor will injure their tender beaks. To keep snakes away, stag-horn should be burned near the coops, as no snake can endure its pungent smell. For fattening, a mixture
of barley meal and flax seed soaked in water, or wheat bread soaked in wine will constitute an effective diet. Ducks and geese differ from the above-mentioned species of poultry in that they require access to a running stream or a pond. In making his purchase of geese, the buyer should select only those which are full-bodied and pure white in colour. The eggs, of which nine to eleven constitute a sitting require from twenty-five to thirty days to hatch. For the first few days after hatching, the goslings should be fed barley-meal and cress seed soaked in water; the best fattening mixture, according to Varro, consists of barley meal and wheat flour soaked in water. Cato advises the same ration, but adds that it should, if necessary be forced down their throats in the interests of more rapid growth. Ducks require but little care. Provided a marshy pasture is accessible, along with a mixed diet of wheat, barley, and grape-skins, these birds will take care of themselves.

2. Cato, Agr. LXXXIX.
The game preserve, provided one existed on the farm, should be stocked with rabbits, boars, and roes. To their maintenance Varro devotes precisely one sentence:

of all these the care, increase, and feeding is thoroughly evident.

Presumably he means that, provided the animals are fed and allowed to breed in a manner and habitat as nearly natural as possible, further care is not essential. Snails should be enclosed in a place entirely surrounded by water, and allowed to forage for themselves; if the owner desires to fatten them, he may place them in a jar containing must and spelt. Dormice again require but little care; provided they have a dry place in which to live, and a supply of nuts for food, they can be trusted to take care of themselves.

To the subject of bees and their care, both Vergil and Varro devote the most minute attention. Both writers pay tribute to the remarkable intelligence

2. Ibid, III, xiv.
3. Ibid, III, xv.
of the bee and to the community of labour in the hive, but both make the mistakes of assuming, first, that bees are originally born spontaneously from the carcass of a dead ox, and secondly that the leader of the hive is a "king" and not a "queen" bee. In defence of our authors, however, it may be pointed out that this latter error was discovered only in the Seventeenth Century. In all other respects, their information is so accurate, and their treatment so thorough that their works remain standard references for the beekeeper of the twentieth century.

According to both authors, the site in which the hives are located is a matter of paramount importance. The best situation is one near the villa in a spot protected from winds and storms with a shallow pool or stream nearby; criss-crossed with branches or stones on which the bees may alight to drink without danger of drowning. Furthermore, the

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2. Both authors continually refer to the "king".
3. The correction of this long-standing misconception is credited to Ian Swammerdam, a Dutch naturalist who lived 1637-1680.
hives should be so placed that they cannot be overturned by the animals of the farm, and where woodpeckers, lizards, and swallows cannot attack the bees as they go and come in their work. The hives may be round or rectangular, made of willow branches, wood and bark, or even a hollow tree stump; an earthenware hive is less satisfactory since it is more quickly affected by heat and cold, extremes of which are harmful to the colony. Inside and out the hive should be plastered with mud and leaves; the entrance should be narrow, both to protect the bees from extremes of temperature and to lessen the danger of attack by foes.

In order to ensure a constant and dependable supply of food for his colony, the owner should be careful to plant near the hives a profusion of shrubs and flowers beloved by the bee - rose, thyme, poppies, clover, and alfalfa. Of all these plants, thyme is the most essential, as it enables the

bees to produce the finest honey, from the standpoint both of flavour and quantity. During the winter, or if inclement weather occurs at other seasons, the owner should see that sufficient food is provided for his bees, until a supply from ordinary sources is once more available; unless provision is made for their sustenance at such times, the bees will either die of starvation or desert the hive. By boiling ten pounds of figs in four gallons of water and placing the boiled figs and syrup in shallow pans near or even inside the hive, the bees will be able to exist until their natural food is once more available. The general health of the hive should be the subject of continuous attention; if the bees appear sleek and smooth of body, and swarm thickly, no anxiety need be felt, but if they seem listless or have a rough and shaggy appearance, the hive should be fumigated with smoke and all the old, foul wax cut away. If it becomes necessary to move the hive, the operation

should be performed gently and slowly, with as little disturbance as possible; as an additional precaution it should be coated with sweet-smelling herbs to attract the occupants to their new home. On the occasion of a swarm, the bees should be attracted by a white cloth to a place previously prepared for them. When the honey is removed, at least one-tenth should be left in the hive, in order that the bees may not become discouraged and desert the hive with consequent loss to the owner.

It is a tribute to Vergil's poetic genius that, throughout the Fourth Georgic, he portrays the life and work of the tiny bee in language that would well befit the epic history of a great nation, without seeming grandiose or affected. In glowing terms he describes the self-sacrificing valour with which the bees will fight in defence of home and "king" and lay down their lives in the wounds they inflict on the foe. Their industry he compares to the toil of the Cyclops, portraying in language that is

majestic in its sweeping cadence how the older bees remain at home to build the cells and care for the helpless young, while the workers rush forth at dawn, toil all day at their appointed tasks, and return in the shadows of evening to their welcome repose. Or how, like mariners with ever a watchful eye on the sky and approaching storm, they attempt only brief excursions when the easterly wind holds threat of rain and tempest. And again, even as in a mighty nation, all is calm and peaceful while an adored ruler lives and rules, but when he has died, strife and discord seize upon the erstwhile contented hive and the workers demolish the fruits of their own toil - Vergil's sorrowful commentary upon the folly and the futility of Civil War. Truly, had Vergil never attempted the composition of the Aeneid, had he never essayed the glorification of Augustus and Imperial Rome, his name would nevertheless command the everlasting respect of the ages through the deathless beauty of his last Georgic.
CHAPTER IX

Fertilization and Drainage

In the important matters of fertilization and drainage, the Roman farmer, in comparison with the modern agriculturalist, was at a definite disadvantage. True, he realized the necessity for crop-rotation and summer fallowing; also he clearly understood the value of manure in maintaining the fertility of the soil, but of modern chemical fertilizers, he could, naturally, have no conception. During the last few years, the science of soil chemistry has made it possible for the farmer to discover in exactly what elements his soil is deficient; for each deficiency a chemical fertilizer is available. It should be noted, however, that the modern farmer, while admitting the value of artificial fertilizers for specific purposes, still regards barnyard manure as the "complete" fertilizer, and if compelled to make a choice between chemical fertilizers and
natural manure, would undoubtedly choose the latter. In the matter of drainage, also, the use of cylindrical tile manufactured from clay or cement has made possible a type of drainage which is inestimably superior to the open, surface drains of the Roman period.

In his customary terse manner Cato makes the following statement, which clearly indicates the importance which he attaches to manure.


This statement, although almost epigrammatic in its brevity, clearly means that manuring is almost as important as thorough ploughing. A further injunction substantiates this theory.

See to it that you have a manure pile of goodly size. Save the manure carefully, keep it clean of foreign matter, and when you haul it out, break it up thoroughly.

Varro, also, adds a word to Cato's instructions.

1. Cato, Agr. LXI.
2. Ibid, V, 8.
Close at hand you ought to have two manure-pits, or one pit divided into two sections. In the one should be placed the new manure; from the other the well-rotted manure should be hauled out to the fields, for well-rotted manure is the best. The manure-pit should be protected from the sun by a covering of saplings and leaves, for the sun dries out the essence which the land requires.

Surely one must admit that these definite instructions prove how fully the Roman farmer realized the value of manure.

With respect to the various types of manure, Varro remarks that bird manure is the most valuable. This should be scattered thinly on the land, rather than left in piles, as was apparently the practice in the use of cattle manure. Next in value comes the manure of goats, sheep, and asses. Horse manure, Varro concludes, is less valuable, generally speaking, but is useful on grain and meadow land, as the food of the horse is derived from these two sources. Cato makes no comment with respect to relative values, but merely advises careful conservation of the manure supply.

1. Varro, R.R., I, xxxvii, 1, 2, 3.
On the modern farm, manure is usually hauled out to the fields before the fall ploughing, or else during the winter, when the ground is frozen hard enough to make hauling easy. Cato, however, advises that it be hauled out at the beginning of spring to meadow land, and to other fields in the fall. He advises, further, that the manure should be divided according to the following rule - one-half for the forage crops, one-fourth for the olives, and one-fourth for the meadows. This we may interpret as a general rule, subject to any variations necessitated by the comparative acreage devoted to each crop and by the comparative fertility of the soil in various parts of the farm.

In addition to the use of manure, our Roman authorities mention two other means by which land may be fertilized, namely, by ploughing under certain green growing crops, and by the use of compost. Cato and Varro agree that crops of lupines, beans,

2. Ibid, XXIX.
and vetch, if permitted to grow for a time will enrich the ground when ploughed under, or even if permitted to lie on the ground. Humus or compost, Cato adds, may be made by mixing straw, lupines, chaff, bean stalks, ilex and oak leaves, and permitting them to rot. Also, they may be used as bedding for the sheep and cattle; if so used they would naturally count as manure when rotted. The same author also states that amurca, if mixed with water and sparingly applied, will increase the yield of olive trees; in large quantities however, it will harden and sterilize the ground.

Neither Cato nor Varro mentions clover or alfalfa as soil building crops; thus we must conclude that the nitrogen-storing properties of these plants were unknown to the Roman farmer.

Although the subject of drainage may seem at first glance to be entirely divorced from the subject of fertilization, there exists a very close relationship between these two departments of farm management. Land may be naturally rich, or heavily
manured each succeeding year, but unless the drainage system is adequate, the fertility of the soil will merely degenerate into "sourness". Thus we find that both Cato and Varro offer advice with regard to the problem of drainage. It has already been noted that Varro favours a farm on which the land has an even slope; manifestly, such a contour makes draining a relatively simple matter. Ditches, Cato advises, should be dug trough-shaped, particularly if the land is marshy, three feet wide at the top, four feet deep, tapering to a width of approximately one foot at the bottom. These should be lined with stone, or failing stone, with willow branches or even bundles of brushwood. The best time for installing drains, he continues, is the winter season, when cultivation is necessarily at a standstill. Even during the growing season, however, if water is lying anywhere on the grain-fields, it should be drained off.

2. A modern tile drain, well laid and in good condition, will work with a fall of one inch per hundred feet of length.
4. Ibid, CLV, 1, 2 ad fin.
immediately. Varro makes no comment with regard to
methods of drainage, but suggests merely that this
work be done during the winter months.

In view of the foregoing summary, one
will readily admit that the Roman farmer well realized
the vital necessity of fertilization. Apart from the
modern use of chemical fertilizers, his knowledge of
manures was practically as complete as our own. In
fact, when one hears of twentieth century farmers
who crop land continuously without giving a thought
to the maintenance of the soil’s fertility, he is
almost inclined to feel that Cato and his successors
were wiser in this matter than many agriculturalists
of the present day. In the matter of drainage, how­
ever, it must be admitted that the Roman farmer made
little progress; in his defence it may be pointed out
that he fully appreciated the importance of removing
superfluous moisture from the land, and carried out
this objective with the best means at his command.

CHAPTER X

The Religious Aspect of Roman Agriculture

It is generally admitted that Roman religion, in comparison with that of Greece, was an unimaginative conception of certain occult forces and processes that man could not fully comprehend. In a word, Roman religion was essentially a practical working agreement between man and god; if certain rituals, sacrifices and ceremonies were duly and correctly observed, the god was in honour bound to lend a favouring ear to the suppliant's request. If the god failed to perform his share of the contract, the worshipper might feel himself absolved from the necessity of further prayer or sacrifice to that particular deity. Since the Romans were originally a farming people, and as many of their gods thus had their origin in the various activities of the farm, it is not surprising to find that the element of religion, or rather the element of religious observance
is particularly marked in Roman agriculture; consequently we find that each of our authors, after his own individual fashion, pays tribute to the tutelary deities of the farm. Cato, practical as always, gives minute and painstaking directions for the propitiation of the gods of field and home; Varro commences his treatise with a lengthy invocation to all the deities who are concerned with the various branches of farm activity; Vergil, at the commencement of each Georgic, calls upon the god whose particular province in Agriculture he is about to enter.

After a brief statement of the fact that agriculture is to be the subject of his writings, Varro at once calls upon the gods of the farm for their favour and assistance in the task he has essayed. To quote his invocation.

I invoke, not the Muses of Homer and Ennius, but the twelve 'Councillor Gods' who are the directors of the farmer. First I call upon Jupiter and Tellus, who by means of Heaven and Earth embrace all fruits of cultivation,

and thus are called the 'Great Parents', Jupiter being called 'Father' and Earth 'Mother'. Then I beseech the favour of Sun and Moon, whose periods are observed for sowing and harvesting. Thirdly I invoke Ceres and Liber, since their fruits are most essential to life, for it is through them that food and drink come from the farm. Fourthly I call upon Robigus and Flora, for when these are favourable, rust will not harm the crops, nor will they fail to produce flowers in due season. Likewise I pray to Minerva and Venus, one of whom protects the olive, the other the garden. Also I invoke Lympha and Bonus Eventus, for without moisture all cultivation will be parched and barren, and without success and good issue, farming becomes, not farming, but disappointment.

Although Cato indulges in no formal invocation to the gods, he describes in detail the various rituals upon which the prosperity of the farm depends. In each of these ceremonials it is well to note that Cato lays the greatest stress upon the actual form of the observance; from his insistence upon detail we may readily assume that the Roman farmer envisioned his gods as being singularly exacting with regard to the form of the worship tendered to them. A study of the ritual to be performed before
a grove is thinned will amply illustrate this point.  

Sacrifice a pig, enjoins Cato, and offer the following prayer; 'whether thou be god or goddess whose sacred possession this grove is, as it is thy right to receive the sacrifice of a pig for the thinning of this sacred grove, and with this purpose, whether I or one at my command do it, may it be rightly done. By the offering of this pig sacrificed to thee, I pray that thou wilt be gracious unto me, my house, my household and my children. May thou be glorified by this pig sacrificed unto thee for this end.' If you wish to cultivate the land, make a second offering in the same way, and add the words, 'for the sake of doing this work'. As long as the work continues, offer this prayer each day in some part of the land; if public or family feast-days intervene, a new offering must be made.

Or again, when the pear trees are in bloom, and before spring ploughing begins, an offering consisting of wine and roast meat must be made for the health of the oxen, to the accompaniment of the following prayer.

Jupiter Dapalis, be thou glorified by this feast placed before thee, and by this wine placed before thee.

At the same time an offering may be made to Vesta, at the discretion of the farmer. To ensure the health

1. Cato, Agr. CXXXIX, CXL.
2. Ibid, CXXXI, CXXXII.
of the cattle, an offering of ground grain, bacon, meat, and wine must be made to Mars Silvanus; but, adds Cato bluntly, no woman may take part in, or even witness the ceremony. Before the harvest, offerings to Ceres, Janus, and Jupiter must be made, accompanied by prayers that such offerings will be acceptable to the gods.

For the important ritual of purifying the land, Cato again gives minutely detailed instructions.

Bid the offering of a pig, a sheep and a bullock to be led around the farm, with these words, 'That with the kindly help of the gods all our work may turn out well, I bid thee, Manius, to take care to purify with this sacrifice my farm, my fields, my land, in each part that thou thinkest they should be driven or carried around'. With an offering of wine to Janus and Jupiter, speak these words, '0 Father Mars, I beg and beseech that thou wilt be favourable and gracious unto me, my house, and my household; for the purpose thereof I have bidden this sacrifice to be led around my farm, my fields and my land. That thou protect and guard me from illness, seen and unseen, barrenness and desolation,
disaster and unseasonable events; and that thou permit my fruits, my grain, my vineyards, my groves to increase and flourish. And preserve in good health my shepherds and my flock, and give good health to me, my house, and my household. For these purposes, to purify and make pure my fields, my farm, and my land, as I have heretofore said, may thou be glorified by the offering of this sacrifice; and, O father Mars, may thou for the same purpose be glorified by the sacrifice of these victims'.

In addition to these rituals of offerings and sacrifice, Cato in numerous instances makes minor suggestions pertaining to religious observance. Neither the farm-manager nor the housekeeper may engage in religious observances without the consent of the master; nor may the overseer consult any soothsayer, astrologer, or Chaldean. Even before the master goes on a tour of inspection around the farm, he must pay his respects to the gods of the household. The mere mention of possible misfortune causes Cato to interject the expression "bona salute", which may be translated "May Heaven forfend". Again,

1. Cato, Agr. V, 3, 4; cf. also Cato, Agr. CXLIII, 1 ad fin.
2. Ibid, II, 1.
3. Ibid, IV, 1 ad fin.
the sower must not cheat the grain-fields in the matter of sowing, as this is a sure precursor of misfortune. These examples, although less striking than the involved ritual previously described, suffice to prove that religious observance on the Roman farm was an important part of the daily routine.

The close inter-relation between Roman agriculture and Roman religion is attested by the agricultural origin of many of the major Roman festivals and holidays. Of these the greatest was the Saturnalia, celebrated annually at the close of the vintage and the harvest in honour of Saturn, a legendary king of early Italy, who first taught the practice of Agriculture. This festival, so similar to our Harvest Home and Thanksgiving, was celebrated with feasting and merrymaking - expressing the thanks of the people for a bounteous harvest. Or again, we might mention the Liberalia, which observed annually on March 17, was designed to do honour to Liber.

2. A touch of "Christmas" was noticeable, too, in the giving of presents.
god of wine. On this auspicious occasion, Roman boys assumed the "toga virilis", emblematic of attaining the status of manhood and citizenship. Mars, second only to Jupiter in the adoration of the Roman people, was originally an agricultural deity, whose role of god of war was superimposed upon his earlier function of the protector of agriculture. To the end of the Pagan era, both public and private sacrifices continued to consist of the humble animals of the farm - the sheep, the goat, the pig, and the snowy bullocks immortalized by Vergil. Truly, Roman religion, and through religion, Roman society had its roots deep in the agricultural background of the Roman people; upon that substantial and enduring foundation was built the world-wide Empire, which to succeeding generations has been synonymous with the mighty name of Rome.
CHAPTER XI

The Labour Supply on the Roman Farm

The widespread use of machinery by the modern farmer has not only materially reduced the drudgery of farm labour but has also brought about a sharp decline in the number of men necessary to carry on the manifold tasks of the farm. On the Roman farm, however, an entirely different labour-situation existed. There was virtually no labour saving machinery; consequently, all work had to be done by hand, a fact which necessitated an infinitely larger staff than would be required on a modern farm of comparable area devoted to similar crops. That most of this work was performed by slave labour cannot be denied; a fact less generally realized is that a certain amount of hired labour was employed. Varro definitely states that the heavier farm operations, such as the harvest and the vintage should be handled

by freemen, temporarily hired for the occasion. The reason for Varro's suggestion is obvious; to possess a number of slaves sufficient to carry on these seasonal occupations as well as the routine work of the farm would necessitate a staff so large that employment for many of the hands would be lacking at slack seasons. Recalling the old adage that "Satan always finds some mischief for idle hands to do", one is inclined to agree with Varro when he advises that sufficient slaves be maintained for the regular work of the farm, with the addition of hired help or "day-labourers" when the pressure of work is abnormally heavy.

It has already been noted that, for an oliveyard of 240 iugera, Cato advises a personnel of 13 slaves; for a vineyard of 100 iugera, 16 slaves. Thus it is evident that the number of slaves required was proportional, not to the actual area of the farm, but rather to the type of farming practised. Varro, quoting Saserna, states that one man should be

1. Cato, Agr. X, XI.
2. Sasernae (father and son) were Roman writers on agriculture, quoted by Varro in several instances.
sufficient for eight iugera as a general rule, but that, if the land is intensively cultivated, the amount of land per slave must be reduced. Apparently at a loss to establish a definite formula applicable to all instances, Varro suggests that the farmer should observe other farms in his neighbourhood, and be guided by their example.

The duties of the "vilicus"—that is, the farm manager or overseer, appear to have been very onerous. For once, Cato waxes almost eloquent; so detailed and comprehensive are his instructions that a complete translation seems warranted.

These are the overseer's duties. He must enforce good discipline among the slaves. Feast days must be observed. Let him keep his hands off the property of others, and carefully guard his own. He must adjudge disputes arising among the staff, and if anyone has committed any offence, he must punish the offender accordingly. He must look after the slaves of the household and see to it that they are neither cold nor hungry. He must keep the work going, for in this way he will keep the slaves more easily from theft and wrongdoing. If the overseer refuses to do wrong, (the slaves) will not do wrong either. If, however, he

suffers any sin to be committed, the master must punish him. For work well done, the overseer should express his gratitude; in this way other slaves will be glad to do their work in a proper manner. He must not be a wanderer, he must always be sober, and he must never go out for dinner. He must keep the hands employed, and make it his business to see that the master's orders are faithfully carried out. Let him never think he knows more than the master. His master's friends must be his friends. He must pay heed to whomever he has been ordered to obey. He must perform no religious rites, except the Compitalia at the cross-ways or before the hearth. He must sell nothing on credit without the master's orders, and collect for sales made by the master. He must lend no one seed grain, fodder, meal, wine, or oil. He should have two or three households, and no more, from whom he borrows necessities and to whom he lends. He should check over accounts often with the master. He should not keep the same labourer, servant, or caretaker for longer than a day (at a time). He must buy nothing without his master's orders, and must keep nothing hidden from his master. He must have no parasites about him. He must have no dealings with soothsayer, augurer, or prophet. He must not cheat the fields in the matter of sowing, for this is most unlucky. He should be able to perform any work on the farm, and should perform such work frequently, provided only that he does not tire himself. In so doing, he will learn what is in the minds of the slaves, and they, on their part, will perform their work with better feelings.
If he does (such work), he will be less inclined to wander about, he will be in better health, and will sleep more soundly. He must be the first to rise in the morning, the last to retire. Before going to bed, he should see that the villa is closed up, that each slave is asleep in his own bed, and that the cattle have feed.

Varro adds that, as a reward for the efficient discharge of his duties, the overseer should be treated a little more liberally in the matter of food or clothing, and permitted to graze some cattle of his own on the farm. The same treatment should also be accorded to the workers, when they have worked well and faithfully.

With regard to the housekeeper, Cato suggests that it is sound policy to marry her to the overseer. But whether wife or not, comments Cato in a final injunction to the overseer, "make her stand in awe of you". She also has definite duties to perform, which Cato describes in considerable detail. She must not be extravagant, nor manifest a tendency to go out visiting or to meals. She must keep her-

1. Cato, Agr. CXLIII.
self and her house clean and neat, and only engage in such religious observances as are ordered by the master. She should keep hens, to ensure a supply of eggs. She must keep a supply of food always on hand for the master, should he happen to make an unexpected visit. She must thoroughly understand all methods of preserving and drying fruits, as well as the grinding of grain into flour. In short, we may summarize her duties by saying that they were fundamentally the same as those of the modern farmer's wife.

In speaking of the slaves employed on the farm, Varro mentions three points which are of particular interest. It is advisable, he says, not to have too many of the same nationality, as this will lead to domestic strife. Secondly, slaves should be encouraged to intermarry, as this will make them become more attached to the farm, and incidentally will ensure a future supply of slaves for the master. Finally, they should not be excessively

2. Ibid, I, xvii, 5.
meek or excessively high-spirited, but those selected as foremen should be somewhat superior to their fellows in ability and education.

In selecting herdsman for the flocks and herds, Varro suggests that old men or young boys are suitable for this work if the flocks are being grazed on the farm. If, however, the animals are out to pasture on range land or in the hills, the herdsman should be young men, lithe, supple, and well armed; the best slaves for this work, he continues, come from Spain and Gaul. If the herd is very large, or if a number of flocks or herds is being pastured together, it is advisable to have a senior herdsman in charge of the whole group.

The food issued to slaves on a Roman farm was, naturally, not of the highest quality. With his customary attention to detail, Cato gives advice pertaining to the amount of food necessary for each slave. In winter, he suggests, four pecks of wheat

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1. Varro, R.R., II, x, 1, 2.
2. Ibid, II, x, 3, 4.
3. Ibid, II, x, 2.
is sufficient, with a slight increase during the summer months. Outside labourers should receive four pounds of bread during the winter, increasing to five during the summer. In addition, olives which have been blown from the trees by the wind, or damaged in picking, should be issued to the labourers; when the supply thereof is exhausted, fish-pickle or vinegar may be issued instead. Each slave should receive one pint of oil per month and one peck of salt per year. The poorer wine, or that of unsatisfactory flavour should be given to the slaves, with a little extraration for the celebration of the Saturnalia and the Compitalia. The average annual allowance of wine for each slave should amount, Cato estimates, to sixty gallons.

In a brief statement concerning clothing for the slaves, Cato advises that a tunic, blanket and a pair of wooden sandals should be supplied to each slave every other year; for the

2. Ibid, lvii.
3. Ibid, lix.
sake of economy, quilts should be made from the worn out tunics and blankets.

However much we may deplore widespread employment of slave labour on the Roman farm, we must not overlook the fact that slavery was common to all branches of Roman industry. Nor was the position of the slave entirely hopeless; in some instances, at least, a slave was rewarded for diligent and faithful service, for Varro, in a passage already referred to, suggests that, for work well done, a slave should be permitted special little privileges. Thus we may conclude our consideration of the labour situation on a Roman farm by saying that the farm slave was no worse off than his brethren in other industries, and certainly fared as well as the negro on a Southern cotton plantation less than one hundred years ago.
CHAPTER XII

The General Conduct of the Farm

Although the major operations of the farm have been dealt with in preceding chapters, several points pertaining to the general conduct of the farm have not yet been considered. These, in general, do not apply specifically to a single branch of farm activity, but are broad general statements whose observance is vital to the profitable management of a farm. Nor is their importance confined to farm management of the Roman period alone; all of them are points which the successful farmer of the present day would admit to be of the utmost value.

Foremost among the points which Cato from time to time offers for our consideration is his insistence upon economy, a practice which he stresses so constantly that one feels it is almost an obsession with this rugged "old-school" agriculturalist. Early, in the De Agri Cultura he makes the abrupt comment

that a farm is very like an individual; however great
the income, over-extravagance will consume all the
profit. "Over-extravagance" we may interpret as
having several different phases of meaning; land
whose cultivation is too costly in proportion to the
returns derived from it, carelessness in the care of
crops or herds, unchecked idleness on the part of
workmen, unduly costly buildings or implements - all
these will reduce the profit from the farm. In a
later passage this point of view is substantiated.

When the weather is stormy look around and
see what can be done indoors. Clean things
up rather than be idle. Keep this fact in
mind, that even though no work is accom­
plished, expenses, nevertheless, continue.

In several instances Cato mentions work which can be
carried on indoors, even if inclement weather prevents
work on the land.

Remind the overseer, he advises, of the
work which could have been done in bad
weather - washing wine vessels and coating
them with pitch, cleaning up the buildings,
moving grain, hauling out manure, making
a manure-pit, cleaning grain for seed,
mending old harness and making new, mending
clothing.

1. Cato, Agr. XXXIX, 2 ad fin.
2. Ibid, II, 3.
Even on holidays, when work on the land was contrary to established custom, Cato suggests that certain routine operations - cleaning ditches, cutting brambles, building roads - may provide employment for the labourers. In these ways profitable employment of the workmen may continue, even if work on the land is temporarily halted; furthermore, if slaves are kept busy they will be less inclined to quarrelling and mischief-making.

As another point of economy, Cato suggests that nothing should be kept on the farm which is not of practical value.

The farmer, he remarks, should be a seller, not a buyer, and advises the sale of surplus oil, wine, grain, old oxen, faulty sheep, aged cattle, wool, hides, and even slaves who are old or sickly. Such callous treatment of slaves is an evidence that humanitarianism was strangely lacking in Cato; even an old horse, according to Vergil, deserves an honourable retirement.

2. Ibid. II, 7, ad fin.
Some of the latter sections of the De Agri Cultura, as Varro caustically points out,
seem to bear little relation to farm management. In these Cato gives minute instructions for the making of placenta, savillum, erneum, starch, etc., and dwells glowingly upon the medicinal value of the cabbage. In Cato's support, however, let it be realized that he regarded "buying" in general as a habit to be avoided, and is consequently suggesting means whereby the farm may be made a self-sustaining unit. Thus, while we may advisedly discount the marvellous medicinal qualities of the cabbage, we should remember that the medical science of this period, even when practiced by so-called "experts" was by no means infallible. The basic fact, however, remains, that Cato wished to curtail expenditures by the use of farm products for all possible purposes.

Cato's abhorrence of waste in any form is admirably exemplified by the varied uses which he suggests for amurca. This liquid, although actually

2. Cato, Agr. LXXV-LXXII, CLVI - CLVIII.
a by-product from the olive-press, seems to have been almost as valuable as the oil itself. To steep new oil-jars, Cato suggests that they be filled with amurca and left standing for seven days. To make the threshing floor hard and impervious to moisture, amurca should be poured on the ground in plentiful quantities; the threshed grain may likewise be protected from mice and other vermin by coating the walls of the granary with a plaster made from amurca and chaff. To increase the yield of an olive tree, or to make a fig-tree retain its fruit, a mixture of amurca and water should be poured in small quantities around the roots. Caterpillars will not attack a tree, adds Cato, if its trunk and lower branches have been treated with a mixture of bitumen, sulphur and amurca. Combined with wine dregs and water in which lupines have been boiled, it will protect sheep from skin diseases if applied externally to the hide.

1. Cato, Agr. C.
2. Ibid, CXXIX.
3. Ibid, XCII.
4. Ibid, XCI, XCIV.
5. Ibid, XCV.
after shearing. Figs may be kept fresh indefinitely if placed in an earthenware jar coated with amurca. Wood which has been dipped in this remarkable liquid and then dried will blaze more brightly without smoking. Cattle which are "off their feed" may be restored to good appetite if their food is sprinkled with amurca, or if a little is placed in the drinking water. An excellent wall plaster may be made of clay, amurca and straw. Finally it may be used as dressing for belts, shoes or hides, and will also do noble service as axle grease. With all due deference to Cato, one is nevertheless reminded of the remarkable capabilities attributed to certain patent medicines by their manufacturers.

During recent years, the practice of "share-cropping" has become increasingly prevalent in Canada. Consequently, the manner in which this method of farming was carried on in the Roman world

1. Cato, Agr. XCVI.
2. Ibid, XCIX.
3. Ibid, CXXX.
4. Ibid, CIII.
5. Ibid, CXXVIII.
6. Ibid, XCVII.
is particularly interesting. On one point, especially, Cato is insistent: there must be a definite, clear-cut agreement between the two parties affected. He advises that the division of the crop be based on the fertility of the soil, varying from one-eighth to one-fifth (to the tenant) in inverse ratio to the quality of the soil. In share farming land where the principal crop is the vine, the tenant should keep the whole farm well tilled and in good repair, and should be allowed sufficient fodder for the stock; the distribution of all produce to owner and tenant should be equal. Although this latter division, by comparison with the former, may seem of undue benefit to the tenant, we should keep in mind that the cost of maintaining a vineyard and mixed farm (in labour, implements etc.) would be considerably higher than on a farm producing grain only. For the leasing of winter pasturage, Cato once more enjoins a definite contract stating the dates on which pasturage should

1. Cato, Agr. CXXXVI.
2. Cato, Agr. CXXXVII.
3. Ibid, CXLIX.
begin and end. If damage is done by either owner or leasee, Cato suggests that an independent tribunal decide upon the amount of damage sustained. Pending settlement of such a claim, all livestock and servants are to be held as security. In the same manner, Cato advises a formal agreement for any farm work done by contract, such as the gathering of olives or grapes, or for the sale of olives, grapes, wine, or other farm produce. This policy finds an echo in Varro, who details a fixed formula to be observed in the purchase of cattle, sheep, and other farm animals.

In reviewing Roman agriculture as a whole, one cannot fail to be impressed with the emphasis upon thoroughness which is everywhere enjoined in the precepts of our Roman authors. This thoroughness is not a pose, nor is it a feature of Roman agriculture only, but a national characteristic. The same deliberate thoroughness, the same attention to detail, were the factors which enabled Rome to overcome the threatening power of Carthage, to extend her dominion over the whole Mediterranean world and
to develop a code of laws and political science which still endure as basic features of our western civilization.
Modern Agriculture in Italy

The tragedy of Roman agriculture lies in the fact that the science developed by the Roman farmer failed to survive the fall of the Empire. This failure, however, is not surprising, since other forms of Roman civilization likewise crumbled before the impact of barbarism. Throughout Italy, the disruption of the Empire was followed by almost fifteen centuries of chaos, but chaos tempered by the survival of the blurred outlines of civilization. Roman roads and aqueducts were preserved; the Roman language was reborn in the Romance languages of the new Europe; Roman literature found sanctuary in the monasteries; but only in scattered districts was there any attempt at the preservation of agricultural science. From the fourth to the seventh centuries, the carefully cultivated farms, olive groves, and vineyards of Ancient Italy were the prey of successive
invaders — Visigoths, Ostrogoths and Lombards. Although the two latter groups remained in Italy, the Ostrogoths near Rome and the Lombards in the Valley of the Po, it was centuries before these crude conquerors learned even the rudiments of agriculture. Still later, bands of Normans swept down upon Southern Italy — the "Oenotria" of Vergil. By 1300, three general divisions had evolved — the kingdom of the Normans in the South, the states of the Church in Central Italy, and numerous city-states, dominated by the Holy Roman Empire in the North. Agriculture was carried on, particularly in the fertile lands of the Po Valley, but it was of a type which our Roman authors would have deemed unworthy of even the early Republic.

Although a new interest in Art and Literature was awakened in Italy with the advent of the Renaissance in the fourteenth century, there was no corresponding revival in agriculture. Perhaps the reason for this retardation lies in the fact that agriculture can flourish only under a strong settled form of government, which did not return to Italy.
until the present century. In spite of the glorious part which individual Italian cities played in the revival of learning during the Renaissance, Italy remained a political patchwork quilt, without semblance of cohesion or unity. Thus when Metternich complacently remarked in 1815 that Italy was merely a "geographical expression", he might well have added that Italian agriculture had ceased to be even an expression almost fifteen hundred years before. In short, Italian agriculture lacked the incentive to progress which only a settled form of government can impart. Such an incentive appeared to be in the offing by 1860, when Italy, under the guiding hand of Cavour, had once more become a political unit. Unfortunately, Cavour's death in 1861 cut short that great statesman's programme of economic reform; no man of comparable ability appeared to carry on his work, and for fifty years longer, Italy staggered under increasingly adverse economic conditions. By 1920, labour troubles, which had become a commonplace feature of city life, had spread to the rural areas, where landowners were
confronted by an embattled peasantry demanding enough land for subsistence. The justice of their actions may be appreciated from the fact that these revolts were frequently led by the parish priests, actuated not so much by antagonism towards the landlords as by a sympathy for the unfortunate peasantry. Internal economic weakness was paralleled by weakness in the field of foreign diplomacy. In 1919, although Italy was numbered among the victorious Allies, she received neither colonies nor mandates, both of which she sorely needed as outlets for her excess population. True, Italia Irredenta had been annexed to Italy, but Italian dreams of a "sphere of influence" on the east coast of the Adriatic and a colonial empire had come to naught. A crushing load of debt, (materially increased by the Great War), the growth of unemployment, a steady rise in the cost of living, constant revolutionary disturbances in both rural and industrial areas, and a corrupt government,—such were the problems facing Italy in 1920. The magnitude and seriousness of these difficulties led both the power-
ful capitalist and landowning classes to give their unqualified support to Benito Mussolini.

Following his "March on Rome" in 1922, and his immediate assumption of dictatorial powers, Mussolini first undertook a thorough "Fascistization" of the Italian state. All administrative posts in national and municipal government were given to loyal Fascists, subject to removal or dismissal only at the order of Il Duce. The Fascist party was the only party permitted to exist; the will of Fascism became the will of the state and of the individual. How this subversion of the individual was accomplished is well-known: rigid press censorship, a ruthless secret police, flagrant intimidation of enemies, even assassination soon removed all vestige of opposition to Il Duce's authority. By 1926, his own position in the state unassailably secure, Mussolini turned to a consideration of economic difficulties, among which the agricultural situation was by no means the least. He found his remedy for this latter problem first in a thorough reconstruction of the economic
life of Italy, and secondly, in a vigorous foreign policy.

The Corporative, or Totalitarian, state, which has been developed during the last ten years, embodies Mussolini's ideas of economic reorganization. These ideas were not hard and fast conceptions, but have passed through an evolutionary process to suit conditions as they arose. With regard to Agriculture, the enactments of the "Collective Labour Relations Law", passed in 1926, are of prime importance. Under its terms, all Italian activity was divided into the following seven classes: industry, commerce, banking, agriculture, maritime and aerial transportation, land transportation and inland navigation, and artistry. In each of the first six units, two confederations were established - one for employers, and one for employees. The seventh unit, artistry, consisted of a single confederation only, since the division between employers and employees was felt to be here indistinct. Below the confederations come in turn the Regional Syndicates, the Provincial
Syndicates, and lastly the Municipal Syndicates. The syndicates have complete control over hours and conditions of labour, wages, and any dispute which may arise between employer and employee; serious disputes to which the syndicate can find no satisfactory solution are submitted to the confederation concerned. In a "Charter of Labour" issued in 1927, Mussolini defined the purpose of his complex organization: the Corporative state would permit private initiative, but this initiative must be regulated in the interests of the nation. Thus the agricultural worker, as did each other class of worker, surrendered his economic freedom to the state, receiving from the state in return the "social security" of collective bargaining, unemployment insurance, and compensation for sickness and accident.

Having thus accomplished his primary regimentation of the Italian people, Mussolini turned his attention towards making his confederations the governing forces of the state, subject to guidance by himself and the Fascist party. By an electoral law of 1928, it was enacted that the confederations
should propose one thousand men as candidates for Parliament. Of these the Grand Fascist Council, consisting of Mussolini and a select inner circle of Fascism, was to select four hundred names for submission to the Italian voters, who would vote "yes" or "no" (theoretically at least) to the entire slate; in other words, an Italian election is now merely a referendum or plebiscite. In this way, Mussolini claims that power is vested, not in a mere "counting of heads" as he caustically terms democracy, but in the productive forces of the state, that is, the confederations.

By laws of 1930-31, there was created a National Council of Corporations, with Mussolini as Chairman. A "Corporation", it may be explained, consists of representatives of the employers' confederation and the employees' confederation in each of the seven branches of Italian industry, in the general sense of the term. The National Council so created is the highest authority to which labour disputes may be referred. From the standpoint of
agriculture, it is important to note that the first case submitted for adjudication was one in which a group of landowners in North Italy attempted to force their agricultural workers to accept a thirty per cent reduction in wages because of the revaluation of the lira in 1927. The workers refused to accept the amount demanded by the landowners, but offered to accept a less drastic reduction. The court, from whose decisions there could naturally be no appeal, decided in favour of the workers.

In 1934, a further law increased the number of Corporations to twenty-two, each based upon a "Cycle of Production". A General Assembly of Corporations was also created, consisting of representatives from each of the newly-aligned corporations. Corporations connected with agriculture, with the number of representatives which they have in the General Assembly, are as follows: Cereals 32; Horticulture, Flowers and Fruit 32, Vines and Wines 32, Oils 23, Beets and Sugar, 15; this distribution indicates conclusively the relative importance of
each of these branches of Agriculture in Modern Italy. The rather vague term "Cycle of Production" may be defined by explaining that each of the 22 corporations mentioned above concerns itself with the various processes by which a raw product is produced and finally transformed to a finished article of commerce. In 1939 it is planned that the General Assembly of Corporations shall replace the parliamentary body which had already been so drastically reorganized in 1928. At that time, therefore, Mussolini's tentative reorganization of ten years ago will make way for a system which will provide further co-ordination between economic and political organization.

Now that the economic structure of the Italian state has been discussed, some of the accomplishments may be noted, with special reference to those affecting agriculture. Post-war Italy had an average density of population of 323 to the square mile, for which her agriculture failed to produce sufficient food. The seriousness of this situation was rendered more critical by the fact that Mussolini
deliberately encouraged a high birth-rate to provide men for his increased armies of the future. To make Italy economically self-sufficient was the aim of Mussolini's programme. Soon after taking office in 1922, he began his "Battle of the Wheat", with a two-fold purpose - first, to extend the area under production and secondly, to increase the yield per unit of area. The success of his campaign is indicated by the fact that in 1932 the production of wheat had increased by 70 per cent over that of 1922, and came within 8 per cent of supplying Italy's normal requirement. During the same period increases in rice, corn and oats ranged from 40 to 60 per cent. The production of wine and olives, to which the climate of Italy is so favourable, was likewise fostered, both to supply the home market and to increase Italian trade abroad. Numerous state-controlled public works were also undertaken, which proved of inestimable value to the farmer. Construction of new roads and railways, the introduction of vast irrigation projects and the draining of swamp-lands have all helped to restore
productivity to a point comparable to that of Ancient Italy. The business depression of 1929-35 acted as a brake upon economic reform in Italy as elsewhere in the world, but the cessation of formerly constant labour disputes, the increase in production, and many worthwhile improvements remain as tangible evidence of what sixteen years of strong centralized government have done to ameliorate the conditions engendered by centuries of decadence.

A vigorous imperialistic policy has formed the second of Mussolini's remedies for economic ills. At first this policy seemed to be directed exclusively towards the Dalmatian Coast. In 1925, Italy persuaded Jugo-Slavia to sign the Netteuno Convention, whereby the right of Italians to buy land in Jugo-Slavia within thirty miles of the Jugo-Slav-Italian frontier was recognized, in return for the granting by Italy of certain commercial advantages to Jugo-Slavia. That the agreement benefitted Italy more than Jugo-Slavia is indicated by the fact that a ratification of the treaty could not be obtained in
the Jugo-Slav parliament until 1928, when the majority of the Croatian delegates (representing the area affected) were absent from the session. In 1926, to further strengthen his hold on the Dalmatian Coast, Mussolini signed the Treaty of Tirana with Albania; under its terms, Italy gained important economic concessions, in return for a doubtful promise to recognize the territorial integrity of Albania. Throughout 1927 Italian penetration of the country continued, but Mussolini's diplomatic manoeuvres with Albania led to friction between Italy and Jugo-Slavia, with the result that the Netteuno Convention was not renewed. Possibly because the area proved worthless from an agricultural point of view, Mussolini seems to have abandoned his Dalmatian penetration without too much regret, in order to devote all his energies towards Italian expansion in Africa.

In December 1934, a clash between Ethiopian and Italian patrols at Walwal (on the border between Ethiopia and Italian Somaliland) gave Mussolini his chance to begin a second Roman Empire. Refusing
to submit the matter to arbitration, and defiantly flaunting the League's half-hearted attempt to apply sanctions, Mussolini, in October 1935, ordered his legions to invade Ethiopia from both Eritrea and Italian Somaliland. Theoretically the invasion ended in victory for the Italian forces when they entered Addis Ababa on May 5, 1936. In the manner of the Caesars, Mussolini announced "A Roman Peace - which is expressed in this simple, irrevocable phrase 'Ethiopia is Italian'." By June 1936, Ethiopia, Eritrea, and Italian Somaliland were organized as Italian East Africa, which for administrative purposes was divided into five provinces. The aim of the conquest, as expressed by a prominent Italian, was "to rationally exploit a vast reservoir of raw materials". The same Italian suggested that the following agricultural products might be obtained in abundance: meat, milk, wool, skins, cotton, coffee, oilseed and cereals. Within a few years it is planned to settle half a million colonists to aid in the pro-

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duction of these commodities. The initial cost, however, has been close to a billion dollars, and although Italy has remained on the gold standard, her budget has not been balanced nor has a financial statement been issued by the Bank of Italy since 1935. Despite this heavy drain upon Italy's financial resources, reports of native uprisings, and the maintenance of heavy military garrisons in East Africa would indicate that Ethiopia is not yet completely conquered. It is yet too early to estimate the final value of Italy's new colonial venture; if she can absorb the initial costs, and if East Africa proves as valuable a producer of raw materials as Mussolini seems to expect, Italy's economic position will be materially strengthened as the new lands are developed. At the present time, however, it is safe to say that Agriculture has benefitted more concretely through internal reorganization than through the outwardly more spectacular advance of Italian arms in Africa.

In surveying the agricultural picture
of modern Italy, one cannot help wondering what the Roman farmer of Cato's period would have thought of the present increasingly elaborate structure. Of the imperialistic policy adopted by Mussolini he would undoubtedly approve; crop-yields, labour-saving machinery, the gigantic engineering accomplishments in irrigation and land-reclamation - all these would arouse his envious wonder. But how, one may well ask, would he regard the loss of individual liberty, the regimented control of his life and labour? Perhaps, true to his old ideal of devotion to the state, he would still regard the state as the be-all and end-all of his existence; more probably, he would feel the cramping stricture of the present ill-concealed despotism, and turn his thoughts to the freedom of speech and action which were the noblest features of Republican Rome.
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