AN ABSTRACT OF THE THESIS OF

MARVIN D. CROCKER
(Name)

for the
DOCTOR OF PHILOSOPHY
(Degree)

in
GEOGRAPHY
(Major)

presented on
4 May 1973
(Date)

Title: THE EVOLUTION OF MEXICAN FOREST POLICY AND ITS
INFLUENCE UPON FOREST RESOURCES

Abstract approved: J. Granville Jensen

During the Colonial Period, in Mexico there was no rational
forest development policy and, as a result, forest resources were
squandered and to a considerable extent destroyed. During the
Nineteenth Century, a rational forest policy began to be promoted, but
in the end, it was translated into a policy of preservation and protec-
tion rather than optimum use and dynamic conservation.

The Post-Revolution Period was characterized by a carry-over
of the preservationist policy and the actual prohibition of forest
resource development on several million hectares of forest land.
Unfortunately, the prohibitions inhibited all forest activity and
commonly promoted unregulated and illegal uses and harvests, there-
by allowing the forest to deteriorate. In some areas, moreover, the
campesino came to view the forest as a hinderance to his well-being
and destroyed it for agricultural purposes.
By the 1940's it was realized by interested legislators and foresters that a policy of rational development with a strong law was necessary if Mexico was to retain her forests. Thus, in 1943, Mexico's second forest law of the Twentieth Century was promulgated. This law provided the organizational means to promote forest development and conservation. The organization provided was the Industrial Forest Exploitation Unit authorized to combine small forest ownerships under long term concessions. With the establishment of these Units came the requirement for professional foresters to plan and manage commercial forest exploitation, mandatory reforestation and other measures for conservation of the forest and forest soils.

The body of forest laws and regulations currently in force in Mexico was enacted in 1960 and in reality is little more than a refining of previous documents, especially that of 1943.

In summary, the analysis makes clear that there has evolved in Mexico an exemplary body of policy, laws, and regulations, sufficient to optimize forest utilization and to assure dynamic conservation of the resource. More regulations are not needed, but there is critical need for greater funding at the Federal level to implement existing regulations and expand education of the public toward the end that the citizenry appreciates and respects forest values.
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The Evolution of Mexican Forest Policy and its Influence upon Forest Resources

by

Marvin D. Crocker

A THESIS

submitted to

Oregon State University

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

June 1973
ACKNOWLEDGEMENTS

The author would like to express his gratitude to a large number of individuals for direction, guidance and aid in completing both the research and the writing of this thesis; however, they are too numerous to name. Nevertheless, special thanks go to Dr. Enrique Beltrán, Director of the Instituto Mexicano de Recursos Naturales Renovables in Mexico City, who so generously provided office space, the use of his library and personal advice and consultation; to the General Director of Forest Developments, Ing. Gustavo Fuentes Lugo, and his staff who so graciously provided letters of introduction and made the necessary arrangements for successful completion of the field work; to the General Directors of the Instituto Nacional de Investigaciones Forestales and the Inventario Nacional Forestal for their cooperation in obtaining information and material pertinent to the topic at hand; and to the Technical Directors of the Unidades Industriales de Explotación Forestal and the industries with which they are associated for helping to make the field work a success.

The author would also like to thank the members of his Doctoral Committee for their guidance and cooperation, especially his major advisor, Dr. J. Granville Jensen and Dr. Richard M. Highsmith, Departmental Chairman, for their unceasing patience and encouragement.

Most of all, the author is deeply indebted to his wife, Lauri, not only for patience and encouragement, but for countless hours of translation, typing and proofreading, and to his daughter, Jennifer, who despite her tender years, was willing to spend long hours walking or sitting in a library in Mexico without so much as a whimper.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>I. INTRODUCTION</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope of Thesis</td>
<td>1</td>
</tr>
<tr>
<td>Research</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. RESUME OF FOREST LAWS, POLICIES, AND ATTITUDES, PRE-1500 TO 1910</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonial Development</td>
<td>7</td>
</tr>
<tr>
<td>Independence Period</td>
<td>11</td>
</tr>
<tr>
<td>Reform Period</td>
<td>20</td>
</tr>
<tr>
<td>Empire of Maximilian</td>
<td>22</td>
</tr>
<tr>
<td>Díaz Regime</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III. EVOLUTION OF FOREST LAWS AND POLICY: 1917 TO 1943</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article 27 as Basis for Forest Law</td>
<td>30</td>
</tr>
<tr>
<td>Influence of Mexican Forestry Society</td>
<td>31</td>
</tr>
<tr>
<td>Mexico's Forest Law</td>
<td>35</td>
</tr>
<tr>
<td>An Evaluation of Forest Law and Policy, 1917 to 1926</td>
<td>36</td>
</tr>
<tr>
<td>Forest Law and Policy, 1927 to 1943</td>
<td>63</td>
</tr>
<tr>
<td>Evaluation of Legislation, 1927 to 1943</td>
<td>65</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IV. MAJOR TENETS OF THE EXISTING FOREST LAW</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Permits Required for all Forest Development</td>
<td>93</td>
</tr>
<tr>
<td>Control of Forest Management Assured by Concessions to Commercial Forest Units</td>
<td>102</td>
</tr>
<tr>
<td>Marking of all Trees to be Harvested is Required</td>
<td>104</td>
</tr>
<tr>
<td>Transportation Documentation is Required for Removal of Products from the Forest Unit</td>
<td>106</td>
</tr>
<tr>
<td>Forest Law Requires Social Responsibility of Concessionaire</td>
<td>108</td>
</tr>
<tr>
<td>Mexican Forest Law is Strongly Punitive and Provides Specific Penalties</td>
<td>109</td>
</tr>
</tbody>
</table>
V. ANALYSIS OF THE INFLUENCE OF LAWS AND POLICY ON TWENTIETH CENTURY FOREST UTILIZATION

Permits Allow Government Indirect Control of Forest Lands
Legally Authorized Exploitation Systems Strengthen Direct Government Control
Effects of Laws and Policy on Forest Resource Quality

VI. OBSERVATIONS OF SELECTED FOREST UNITS

Unit of Las Fábricas de Papel de San Rafael y Anexas
Unit of Maderas Industrializadas de Quintana Roo
Unit of Compañía Forestal de Oaxaca
Unit of Michoacana de Occidente
Unit of Triplay y Madera de Durango
Unit of Bosques de Chihuahua

VII. CONCLUSIONS

BIBLIOGRAPHY

APPENDICES

Appendix I. Highlights of Mexican Forest Policy Development--A Chronology
Appendix II. Glossary
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Documentation utilized in the Twentieth Century and expediting agency.</td>
<td>107</td>
</tr>
<tr>
<td>2</td>
<td>Total prohibitions.</td>
<td>138</td>
</tr>
<tr>
<td>3</td>
<td>Number of properties by size class and tenure system, San Rafael Unit.</td>
<td>148</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chart of organization and duties of each level of forestry portion of Industrial Forest Exploitation Units.</td>
<td>119</td>
</tr>
<tr>
<td>2</td>
<td>Model of the Office of Technical Direction of Industrial Unit.</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>Model of relationship between technical direction of Unit and consuming industry.</td>
<td>121</td>
</tr>
</tbody>
</table>
### LIST OF MAPS

<table>
<thead>
<tr>
<th>Map</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Principal commercial forest types of Mexico.</td>
<td>143</td>
</tr>
<tr>
<td>2</td>
<td>Unidad Industrial de Explotación Forestal de las Fábricas de Papel de San Rafael y Anexas.</td>
<td>145</td>
</tr>
<tr>
<td>3</td>
<td>Unidad Industrial de Explotación Forestal de Maderas Industrializadas de Quintana Roo.</td>
<td>155</td>
</tr>
<tr>
<td>4</td>
<td>Unidad Industrial de Explotación Forestal de la Compañía Forestal de Oaxaca.</td>
<td>163</td>
</tr>
<tr>
<td>5</td>
<td>Unidad Industrial de Explotación Forestal de Michoacana de Occidente.</td>
<td>171</td>
</tr>
<tr>
<td>6</td>
<td>Unidad Industrial de Explotación Forestal de Triplay y Maderas de Durango.</td>
<td>177</td>
</tr>
<tr>
<td>7</td>
<td>Unidad Industrial de Explotación Forestal de Bosques de Chihuahua.</td>
<td>183</td>
</tr>
</tbody>
</table>
THE EVOLUTION OF MEXICAN FOREST POLICY AND ITS INFLUENCE UPON FOREST RESOURCES

CHAPTER I

INTRODUCTION

Based upon the writings of early chroniclers and scholars, especially reports of Baron von Humboldt, many Mexicans have considered Mexico to be a country of forests. This concept continues to dominate much of current literature concerning Mexican resources. However, it seems clear that since the beginning of the conquest, the forests have been gradually destroyed. The reasons vary from over-exploitation, to destruction by fire, either naturally or culturally induced, to the clearing of land for agricultural and urban development.

The development of even the simplest form of forest conscience or conservation attitude in Mexico did not begin until the late 1800's, about the same time it began in the United States, albeit several earlier laws did imply recognition of need for forest conservation.

The 'father' of Mexican forest conservation, Miguel Angel

1 Throughout this writing, the term 'exploitation' refers to use in the developmental sense, rather than in the contemporary English (American) sense of 'getting as much as possible by giving little or nothing in return,' unless qualified by such prefixes or adjectives as 'over,' 'bad,' 'abusive,' or 'illegal.'
de Quevedo, was a civil engineer who felt that forest conservation should consist of 'protection' rather than use with proper management. As a result, the first Twentieth Century Forest Law consisted of the establishment of parks and the prohibition of cutting in many areas. Further, it made little or no mention of good silvicultural practices. Conservation, in other words, became preservation of existing forests rather than rational development and management of the resource. In more recent times, especially the last 25 years, there has been a trend toward a more rational policy of forest development.

This thesis is a review and analysis of the evolution of Mexican forest law and policy and its influence on the utilization of forests and on forest industries in Mexico. Chapter II presents a brief overview of pre-Twentieth Century Mexican Forest Law and policy in an attempt to illustrate the inherent relationship between cultural heritage and present forest realities. Chapter III consists of an in-depth review and discussion of 1) the two basic legal documents (Article 27 of the Constitution of 1917 and the Forest Law of 1926 and its Bylaws) and one proposed legal document (the Proyecto de Ley Forestal y de Arboledas) which established the basis for Twentieth Century forest management policy, and 2) the ensuing forest law and policy of the period 1927 to 1943. The year 1943 was selected as a logical point in time since it marks the adoption of the second Mexican Forest Law. Chapter IV continues the review and discussion of the evolution of
policy, but concentrates primarily on the major tenets of the 1960 Forest Law. Similarly, Chapter V deals with the 1960 Forest Law, but in this case, the emphasis is on influences of the Law and relevant policy upon forest management. Chapter VI presents a series of case studies which serve to illustrate the effectiveness and degree to which the law and policy is followed and enforced. Finally, Chapter VII consists of conclusions drawn from the research.

Scope of Thesis

The thesis is limited to analysis of the evolution of Mexican Forest Law and policy and their influence upon commercial management and development of the resource without entering into aspects of forest economics. In Chapters II and III, a general treatment is presented which includes observations on protection of the forest against fire, insects and diseases, domestic animals and encroaching agriculture, and the prohibiting of forest use. In the later chapters, the discussion is directed more toward exploitation and regeneration of the forest and control by government of industrial development and utilization of forest resources.

Research

The research included extensive library search both in the United States and Mexico, discussions with knowledgeable persons
persons and officials in the field of Mexican forestry, and a wide range of field observations during six months in Mexico. In the fall of 1971, office space was generously provided by the Mexican Institute of Renewable Natural Resources (Instituto Mexicano de los Recursos Naturales Renovables) through the courtesy of its director, Dr. Enrique Beltrán. Dr. Beltrán was very helpful in discussing interpretations of the law, clarifying terminology and establishing appointments with influential and informative government and forest personnel.

The Institute of Renewable Natural Resources undoubtedly has the most complete library in Mexico City treating natural resource topics (if not the entire country). It was here that most of the library research was completed, although research was also done at the National Library, the National Institute of Forest Investigations, the National University, the libraries of the National Bank of Commerce, Bank of Mexico, the National Bank of Ejidal Credit and the National Bank of Agricultural Credit and the National Bank of Finance (Nacional Financiera).

Discussions concerning forest matters were conducted with many individuals, including the following:

General Director of Forest Developments
General Director of the National Forest Inventory
General Director of the National Institute of Forest Investigations
Technical Directors of the six Forest Units observed
Director of the Mexican Institute of Renewable Natural Resources
Officials of the Forest Companies with offices in Mexico City
Officials of the Cámara Nacional de las Industrias Derivadas de la Silvicultura
The first three of the above officials are directly responsible to the Subsecretary of Forestry, while the Technical Directors of the Forest Units are responsible to the General Director of Forest Developments.

The field observations were made at six Forest Units selected as being reasonably representative. Observations were made of actual exploitation practices, marking of the trees to be felled, and generally 'getting a feel' for the realities of Mexican forest operations. These field observations were invaluable in understanding influences of Mexican Forest Law and helping to formulate opinions. The six Forest Units are in the following states and territories:

- Mexico, Puebla and Morelos
- Territory of Quintana Roo
- Oaxaca
- Michoacan
- Durango
- Chihuahua

The Bibliography is based on the library search and publications obtained from the printing offices of the National Institute of Forest Investigations and the National Forest Inventory in Mexico City. It is quite extensive and it is hoped it will be of use to persons concerned with Mexican Forest Resource problems. As will be noted, it is mostly in the Spanish language, an indication of the paucity of available material on the topic in the United States, and one of the reasons for considerable detail in exposition of the Forest Law in this thesis. It is hoped that bringing this material together under a
single cover will serve as a valuable contribution to scholars interested in further pursuit of research concerning Mexican forest matters.
CHAPTER II

RESUME OF FOREST LAWS, POLICIES, AND ATTITUDES

Little record was kept of forest utilization in Mexico during the Colonial and pre-Revolutionary periods. Nonetheless, it is possible to give some indication of the general trend of pre-Revolutionary forest use and what practices and laws were in existence.

During the pre-Columbian period, some forest regulation existed; however, it was said to have been based primarily on the phases of the moon (215;27). Wood during this period was used not

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2 It is suggested that this lack of data has its analogy in the early history of the United States' resource utilization in that natural resources, including land, forests, wildlife and minerals, were often viewed as being limitless, and, therefore, could be squandered according to the individual's whim. In regard to the lack of data, Hinojosa Ortiz makes the following comments (112:49):

Diffícil es no sólo reconstruir la historia de la industria madera en México, sino apreciar con exactitud su situación actual. La falta de bibliografía, de archivos de crédito, de publicaciones oficiales o particulares que consignen datos y cifras segural, impiden una evaluación precisa y metódica.

En los numerosos estudios, informes y reportes que sobre el tema han escrito técnicos nacionales y extranjeros, no encontramos siempre, como base de sus opiniones, planes o consejos, una serie de cálculos estimativos, un conjunto de datos no comprobados científicamente.

Sin embargo, es posible hacer una semblanza muy aproximada de lo que ha sido y es la industria forestal mexicana, aún cuando no podamos cuantificar las consecuencias positivas de su participación en la economía general del país ni las negativas por su formidable impacto destructivo sobre los bosques.
only for fuel, but for primitive construction and manufacture as well. In the Colonial period that followed, most of the forests came to be concentrated in the hands of the Spanish and utilization consisted of extensive, irrational exploitation. The forest material was used for building ships, construction in cities and shoring in mines. Along with poorly managed industrial uses was the degrading of forests by clearing for shifting agriculture, and the pasturing of cattle. This latter use did not necessarily constitute an economic value from the forest, since the wood was generally burned in the process of clearing the land. The result of post-Columbian forest use in Mexico was the destruction or devastation of large areas of valuable forests.

During the period of Independence, land was redistributed, but preference was still given to the European and to the Church which amassed approximately one-half of the property and capital of Mexico. Undisciplined forest exploitation continued, but there was a difference. Irrational exploitation was no longer at the hands of the Spanish, but rather the family and friends of individuals in power. Furthermore, there was an increase in the growth of population with a concomitant growth in the demand for wood and wood products. It was also during this period that policy makers began to think in terms of the nation's total forests, rather than just those along the coasts.

The Reform period which followed is notable for the Ley Lerdo of 1856 under which large concentrations of land by the Church and
civil corporations were forbidden, and for what many scholars consider to be the first forest law of Independent Mexico, the Reglamento de Corte de Arboles en Terrenos Nacionales of 1861 (28:36). Even though this law specifically referred to all forests of Mexico, it was applied only to national forests.

The regime of Maximilian formulated many laws, including a Proyecto de Ordenanzas de Bosques, Arbolado y Exportación de Maderas. Although it was not enforced, it referred to excessive destruction of wooded lands, the problem of fires, increased demand for wood, difficulties in conservation and the lack of adequate forest vigilance. For the forests of Mexico, the lack of implementation of this body of laws may have been one of the most unfortunate aspects of the past.

In its publication, La Silvicultura Nacional, the Cámara Nacional de las Industrias Derivadas de la Silvicultura (38:5) suggests that by 1880, the diverse circulars and dispositions expedited by the government give an indication that concern was awakened over the immoderate destruction and abuses committed in the exploitation of the forests. Thus, by 1880, some control had been extended over the forests by means of dispositions which regulated the cutting of wood, reforestation, pasturing and the combating of fires.

In the 1890's, during the regime of Porfirio Díaz, concern for the forest diminished. Land laws were passed which "... allowed
great areas of valuable forests to pass into the hands of private
owners—in many cases, into the hands of aliens..." (81:37). By
this time, much of the exploitation was for railroads for fuel and ties.
Mexico had approximately 10,000 miles of railroad and, since ties
were not as yet treated with creosote, they only lasted about three
years, creating a demand for some 8 million ties per year. Locomo-
tives also consumed great quantities of firewood. According to Gill,
demand for firewood, posts, ties and mine timbers resulted in great
destruction of forests. Moreover, only about one-half of the tree was
used, with the remainder left in the forest creating a tremendous fire
hazard.

On the other hand, during the 1890's there came into prominence
one of the most illustrious and prolific writers in the field of Mexican
forest conservation, Miguel Angel de Quevedo (1862–1946). It was
de Quevedo who, in a very large part, was responsible for the present
Mexican forest law. While his training was in civil engineering
(Ecole Polytechnic in Paris), he realized early in his life as a pro-
fessional engineer that many of the engineering problems he would be
called upon to rectify would be the result of over-exploitation of the
forests (143:395). Even before the Revolution of 1910, de Quevedo
was active in encouraging the government to establish some control
over forest utilization. In 1904, he "...succeeded in establishing a
central forestry committee within the Department of Agriculture..."
The committee had very little power at first and their activities were confined to the area around Mexico City. In 1907, he returned to France to study forestry. Largely as a result of his French studies, when the first Mexican forest ranger school was established in Coyoacán, it was staffed with French professors. Miguel Angel de Quevedo was appointed to the position of director of the Bureau of Forestry within the Department of Agriculture in 1910, but all the forestry activities were interrupted shortly thereafter by the Revolution of 1910 and the forest service was not reorganized until 1934 during the regime of President Lázaro Cárdenas.

The remainder of this chapter analyzes in more detail the development of pre-Twentieth Century Mexican forest law as background for understanding the present regulation of forest resources.

**Colonial Development**

Mexican forest law is founded in pre-1500 Roman and Spanish law; however, these Old World laws contain little functional forest legislation, nor have been particularly concerned with forests in the New World. For the most part, Roman and Spanish forest legislation appeared only as an adjunct to other legislation, and it was not until after the beginning of the Conquest that laws were passed which referred directly to forests and their uses in the colonies.

Flores de Gortari (2) and Beltrán G. (1) make reference to laws
emanating from Spain and Rome prior to the Conquest. Flores (67:17-18) notes a prohibition against the cutting of trees in the city of Rome, but no reference to conservation of forests. This, he suggests, may have been due to man's lack of a concept of the forest as being functional. Beltrán (28:12) mentions the Siete Partidas, expedited sometime between 1252 and 1284. He indicates that this law was the first of the antecedents to Mexican forest laws. Apparently, the only reference to forest matters was contained in Ley XXVIII, Título XV of Partida VII. It contained the idea that fruit trees and vineyards were important to man as sources of food and that people disposed to destroy or damage them ought to pay for them. Beltrán suggests that this law was one of protective character and was perhaps a forerunner of the protective nature of Twentieth Century Mexican forest law.

Concern for forest destruction near cities was suggested in 1496 by the Pragmática de los Reyes Católicos by virtue of "...prohibiting destruction in woodlands, cities and villages, ordaining that firewood might only be obtained from the branches and not from whole trees" (28:12).

Another law passed in 1510 and ratified in 1533 made wild fruits of the woodlands the common property of the Conquistadores and the Indians. This was the beginning of what was known as 'the principle of equality' (28:12). Its purpose was to avoid abuses of the forests by the Conquistadores.
What may well be the first reference to reforestation was the  
Ordanza de Carlos V which was passed in 1518 (28:12). This  
ordinance refers to the planting of trees in the colonies and suggested  
that it would serve as a remedy for deforestation. Both Beltrán (28:12)  
and Flores (67:22) mention a law passed in 1536, which indicated that  
those Spaniards given grants of land had the obligation of planting  
trees along their borders, as well as putting their land in good con-  
dition. If this was not done, they would lose the land granted to them;  
however, there is no comment as to whether this law was actually  
enforced. Flores suggests that while it may not have been the intent,  
this law in some measure impeded the immoderate felling and insured  
the provision of wood through 'rudimentary nurseries,' but gives no  
evidence to that effect. What appears to have been an extension of this  
law is another law passed in 1539 which stated that the encomenderos  
might plant trees to supply the people or for whatever purpose the  
government might indicate.

The principle of equality was the subject of another law in 1541.  
It indicated that the woods and waters are the common property of both  
the conquered and the conquerors. In this law, a fine of 5,000 pesos  
was to be levied upon any transgressor of this principle (28:12; 67:21).

Forest destruction may well have become more obvious in the  
mid-Sixteenth Century. This is indicated in a study left by Viceroy  
Don Antonio de Mendoza to his successor, Don Luis de Velasco, in
which he discussed the seriousness of deforestation and suggested that, if the existing laws were enforced, the destruction would cease (28:13). About this time, reforestation was presented as a solution to what was seen as a possible social problem and Ley XI, Título XXXI, Libro II, passed in 1552, stated that for the well-being of the community and so that they might not become lazy, the Indians should apply themselves to the planting of trees (28:13).

Ley XIV, Título XVII, Libro IV, promulgated by Felipe II on October 7, 1559, was an order indicating that the Indians could cut all the wood they needed, but only if it did not destroy regeneration. This law, as suggested by Beltrán (28:13), shows a protectionist attitude, one which would prevail for approximately the next 400 years. In 1563, the obligation of giving woodlands to the Indians was introduced. The end result of this obligation was not so much that of giving land back to the Indians as that of protecting the large landholdings of the Conquistadores from invasion by the Indians (28:14). Later, in 1579, public control of the forests was further extended. At this time, it was ordered that no one could cut wood without a license issued by the government. Failure to observe this order would result in the tripling of penalties (28:14). In the same year (1579), and under the same penalties, it was ordered that to obtain firewood, one could only use broken and fallen branches. Flores (67:23) indicates that under this law, when a branch or tree was cut, a shoot or fork was to be left for
regeneration purposes and that even the pruning of trees required a license. This, he suggests, is evidence of a progressively growing preservationist attitude; however, he further indicates that the dispersed preventions or laws against rampant deforestation did not succeed in arresting forest destruction in Mexico.

Not all the laws or ordinances were of a strictly protectionist or preservationist nature. The Ordinance of Felipe IV, passed in 1622, was more concerned with the development of certain species of forest trees. This ordinance ordered that the cutting of mahogany (Swietenia), red cedar (Cedrela) and oak (Quercus) be only for the Crown and that it would be specifically for the purpose of supplying the needs of the Spanish Armada. Beltrán (28:14) suggests that this law be designated as having only a secondary character since its end result was not protectionist, but rather of a developmental character, and that instead of applying to all forests, it applied only to specific species.

For the next 180 years, there seems to be very few laws referring to forestry of sufficient importance to merit mention. Only three are noted by Beltrán (28:14-15). The Ordenazas de la Mesta, for which no date was available, but which seems to have been passed between 1622 and 1748, mentioned a prohibition against starting fires

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3 Cedrela is identified by Cabellero Deloya as red cedar (33:12), a tropical hardwood totally unlike the Western redcedar of the United States.
that might be a threat to conservation in woodlands and pastures. Another law, La Ordenanza General de Montes y Plantíos, passed by Felipe V in 1748, was mentioned not for any specific disposition which it contained, but rather because for the most part it was a compilation of existing fragmentary dispositions. The third law referred to in this period was an edict passed in 1791 which prohibited the cutting of el árbol de la pimienta or dyewood. In the Apuntamientos y Avisos left by the Conde de Revillagigedo, Viceroy of New Spain, to his successor, the Marquis de Branciforte, it was noted that due to the laxity of the natives in the regions of Tamiagua, Papautla and others along the coasts which produced dyewood, the tree was being destroyed. The complaint by the Conde de Revillagigedo was that instead of pruning the trees to obtain the pimienta, a practice which would have allowed the tree to continue production, the natives were simply cutting the entire tree because it was less bother than pruning. The edict which prohibited this practice ordered heavy penalties of fines for violations; the penalty was to be imprisonment.

The final law of the Colonial Period which bears mentioning is the Ordenanza para el Gobierno de las Montes y Arboledas, promulgated by Carlos V on August 27, 1803 (28:15-33; 67:24-27). This ordinance is considered by Beltrán to be of great importance because

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4 This is probably Haemataxilon campechianum (palo de tinte).
it was the first body of law dedicated totally to forest matters; however, there are several other facts worthy of note since they may be found in previous laws or present-day laws or both. It is interesting that the administration of the forest was the responsibility of the Navy. Unfortunately, these administrators knew only techniques of construction with wood and not of forestry. Another carry-over from past policy was the tendency to think only of the forests along the coasts.

The 1803 law was limited to forests within 21 leagues of the sea. This delimitation should not be considered enigmatic since the species included would be primarily hardwoods utilized in the construction of ships and other works of the royal shipyards and arsenals. Nevertheless, by limiting the types of wood to hardwoods, the total effect of the law was decreased. Another administrative point in this law indicated that while private owners had complete and absolute freedom in their choice of development (without the need of a license), their first interest should be for conservation and for growth of the forest.

Furthermore, while this freedom of development was given to private owners, they had the obligation of notifying the Comandante or Subdelegado del Partido of the number and species of trees to be cut. This was to allow the Crown first choice of material (both in peace and war).

According to Flores, Article I, Section XVII of the law indicated that while one was to comply with the letter of the law (which
suggested that deforestation should not be carried out for the purposes of agriculture), there needed to be an acceptable balance between forestry and agriculture. Nonetheless, all infractions were to be penalized. The penalties established by the law were quite substantial and if the individual was insolvent, he was to work out the fine or stand imprisonment.

Beltrán considers several articles in this law to have been breakthroughs in forest legislation.

1) While the administration of the law was left to the Navy, the law established an administrative unit in each region under the direction of an individual who was acquainted with forestry problems in that region;

2) Nurseries and reforestation were considered important for all lands, public or private. Although the private owner was under no obligation to follow through on this concept (forest laws normally pertained only to Crown lands), he should consider the obligation to do so on his own since he was the one to allow deforestation to occur;

3) It was stated that a damaged forest, whether it be by fire, disease or otherwise, ought to be closed to pasturing or other uses, since it would not be able to recuperate if it were being used;

4) Some of the dispositions in this law resembled present-day
Mexican forest law, such as marking trees that should be destroyed and those dispositions that deal with clandestine cutting. Also, it was felt that old and diseased trees should be cut to allow room for the young and new seedlings. Other regulations treated the handling of wood after it was cut;

5) It was thought that conservation regulations ought to be specific and applied only in those regions in which experience had indicated them to be favorable. Their lack was to be considered as an error.

Flores observes that this law denotes a tone of comprehension and the desire for improving the prosperity of the subjects of the state. Since wood was the existing measure of forest value, no relationship was indicated between forests and the erosion of soils, watershed functions, climatological functions and their great agricultural productivity. In any case, the tendency of the state was in keeping with the social context of the day in affirming the constant development of manufacturing centers (for ships, etc.) without forgetting the hearth stone. He states that "...it is possible that the Gabinete de Madrid, in its vehemence for protecting Spanish power, might have thought that the common denominator was based on the magnitude of its fleet of merchant ships, and the legislation concerning forests may fix its origin in such policy..." (67:24). In spite of these and other concepts of the law, it was expressly stated in the law that the poor were
to receive the necessary wood for domestic use (*leña*) and were to receive preference in employment to cut and remove the wood from the forest, a concept found in present-day legislation.

Flores further notes that only a short time after the passage of this law, a public outcry was raised against forest destruction (67:27). He cites an article in the *Diario de México* of March 24 and 25, 1808 which accused owners of being lazy and renters or tenants of being greedy. It was stated that if the destruction was not halted soon, no forests would be left. As an example of the vast destruction, the article cited the mining areas in Zacatecas which were paralyzed because nearby forests had been razed.

**Independence Period**

It is apparent that during the fight for independence and for some years thereafter, little attention was given to the forest matters; although from time to time mention was made of forest problems in various laws. Flores cites a revolutionary mandate by Miguel Hidalgo y Costilla, **Generalísimo de América**, on December 5, 1810, in which he ordered that forests (among other types of lands) should be utilized only at the pleasure of the natives; however, it lacked any form of direction for cultivation or exploitation of said lands (67:27). Shortly thereafter, April 18, 1811, a document of equal stature was dictated in Tecpán by **José María Morelos y Pavón** in his role as
General de los Ejércitos Americanos para la Conquista y Nuevo Gobierno de las Provincias del Sur. Although it was in favor of the Crown and mentioned 'royal rent and its administration,' it contained essentially the same decrees as that of Hidalgo y Costilla.

Flores indicates that with the coming of peace and independence, the Mexican government continued to enforce many of the old Spanish laws. However, the Ordenanza de 1803 and many of the valuable Spanish preventions were ignored and forest conservation was submerged in virtual anarchy for almost 50 years. Nevertheless, he cites two laws which refer to forest matters during this period. One which was promulgated in June, 1824, gave almost free rein over the forest question to the states. The other, dated May 22, 1827, allowed free introduction of foreign wood into Mexico to satisfy internal demands (67:28). Beltrán notes a circular in 1824—a presidential order—which states that before one could export construction or cabinetmaking materials, he had to obtain a permit from the Agencia de Fomento and pay a fee based on the weight of his exports (28:35).

The Agencia de Fomento was a state organization.

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5 Gill notes that "... when Mexico became a free and independent nation, it was still rich in forest resources, in spite of the land decrees of 1813, which had authorized the cutting up and liberal disposition of forest lands" (81:37).
Reform Period

The law passed in June, 1824, which made the forest question a problem for local governments, was essentially abrogated in 1852 when the Secretaría de Fomento was created. Under this action, the forest problem became a function of federal (public) administration (67:28). In Circular 59 of November 25, 1854, the Secretaría de Fomento requested that the Diputaciones Superiores y Territoriales de Minería have available the following information about the regions under their jurisdiction:

1) The number of leagues and classes of trees in the forest (according to Webster's Unabridged Dictionary, a league varies in length, but it was probably 4.24 km);

2) Those dispositions or regulations which authorized cutting and an indication whether it was developed for firewood or for carpentry and cabinetmaking; and

3) The number of trees cut monthly and if they were replaced with new plants.

It would seem that the prime concern was for mine production and not with the condition of the forests other than that they remain productive, since the mining authorities were those placed in charge of the task.

Another circular was promulgated on April 15, 1857 which directed the state governors to observe the existing laws in an effort
to prevent as much forest destruction as possible. This circular was an executive order stemming from the Secretaría de Fomento and was the result of complaints which he had received regarding the immoderate amount of forest destruction. It further stated that only trees of inferior quality could be cut and that for each one cut, four new trees were to be planted. The most severe penalties were to be applied to infractions of this law.

The Reglamento de Corte de Arboles en Terrenos Nacionales, expedited by Ignacio Ramírez, Secretario de Fomento, on April 18, 1861, is considered by Beltrán to be the first Ley Forestal of Independent Mexico (28:36). This law contained many of the same dispositions found in earlier laws as well as in some later laws. It referred to all of the national lands of the country, but did not refer to private lands. Even though it referred to the national lands, it appeared to be concerned with coastal lands for two reasons. One, it indicated that a canoe and rowers would be needed by those individuals of authority, and second, it mentioned reforestation only in terms of planting the seeds of mahogany (Swietenia) and cedar (Cedrela), both of which are tropical hardwoods.

In some respects the law was quite thorough. For example, Article XIV spelled out very clearly the responsibilities of the Subinspectors and the Forest Guards, both of whom were authorities at the local level. Also, it delegated forest administration to the
Agente de Fomento rather than the Navy, as was done in earlier laws. On the other hand, it was reduced in form from the Ordenanza de 1803 and treated the forest in a much less complete manner.

**Empire of Maximilian**

The next major piece of legislation was the aforementioned Proyecto de Ordenanzas de Bosques, Arbolado y Exportación de Maderas drawn up during the Empire of Maximilian. However, since Maximilian was deposed shortly after its appearance, it was not enforced.

On January 24, 1868, the Ministerio de Fomento requested that the Agentes de Fomento de la República furnish information relative to the correct form of development of forest exploitation, the requisites to which the permits were subject and the times during which cutting might be effected. This was considered by Beltrán to be an effort to correct the conditions of cutting in areas in which it was being accomplished incorrectly (28:39).

**Díaz Regime**

In 1878, a circular was published which again indicated an interest in correcting the abuses and excesses in forest exploitation. This proclamation was directed toward the governors, the district judges and the Jefaturas de Hacienda and inquired of them what the
best means might be that would correct the situation and reform the methods of cutting or for the formulation of a new regulation. In 1880, the Ministerio de Fomento issued another circular inviting local officials to sponsor reforestation and conservation (67:32). This circular made further reference to grave deforestation which had been going on over 80 years and listed some of the losses derived from uncontrolled deforestation. By this time, there was beginning to be some concern for the environment as a result of deforestation. This circular mentioned deleterious effects of forest destruction upon health because of modification of the climate, the loss of purified atmosphere, the decrease in spring flow, and the occurrence of flood-waters with the consequent erosion of the land and loss of agricultural production. It also referred to the lack of good developable wood for construction and manufacture as a result of deforestation. Flores seems to feel that although forest destruction is alluded to, the lawmakers of the time did not comprehend the magnitude of devastation taking place, and that even though the government was trying to organize a forest conservation program from a social point of view, it had not yet appreciated forest-community relationships.

On December 23, 1880, the previous circular was reinforced by the issuance of a new circular which insisted that local authorities enforce all dispositions on the subject in an effort to moderate forest destruction. Since the Reglamento de 1861 did not achieve the desired
results, in September of 1881, a new Reglamento was promulgated in which the old error of confining the law to national lands was perpetuated (67:32-33). In general, the Reglamento de 1881 included the same material found in that of 1861; however, it did set up penalties for the Subinspectors and Forest Guards who were not fulfilling their responsibilities. If they were negligent in their duties, they could be fined or moved to another region; but if they were found to be conspiring with those individuals destroying the forest, they were to be denounced before the district judge for castigation.

For the next several years, forest law and policy seems to be mostly concerned with the financial and procedural aspects of the industry; such as prices, taxes, exports, etc. Circulars dated October 4 and 10, 1881; July 14, 1882; September 9, 1884; June 30, 1885; July 10, 1887; February 27, 1887; August, 1889; and March 18, 1890 set prices, mentioned information amounting to an inventory of national forest lands, prohibited the sale of wood cut in areas of reforestation except in retail markets, granting of permits for exportation of wood products, submitting export permits to the Administradores de Aduanas Marítimas, classifying wood for pricing purposes and suggested that more detailed information be made available regarding the time (period) and form of extraction of wood products that had previously only been considered for their income.

On March 26, 1894, a land law was passed under the title of
This law spelled out the conditions for leasing of public lands for purposes of exploitation. Once the leases had been signed, they could not be transferred to anyone else and, prior to exploitation, permits for action had to be obtained. Neither could the permits be transferred since they were personal. Infringement of the foregoing would result in "...administrative or judicial castigation in conformance with the existing laws..." ("...se castigue administrativa o judicialmente conforme a las leyes...") (67:34). The law also allowed the Federal Executive to set aside public lands for the purposes of conservation or planting of trees, for Indian reservations or for purposes of colonization.

The last major forest law of the Nineteenth Century was expedited on October 10, 1894 under the title of Reglamento para la Exploitable de Bosques y Terrenos Baldíos y Nacionales. Flores states that one of the most notable innovations of this law is the uniting of the activities of hunting and fishing with that of the forestry branch (67:35). Beltrán agrees that there are certain linkages between the two, but that hunting and fishing should constitute its own set of laws distinctly apart from forestry. Both authors indicate that this law is a little different from the regulations of 1861 and 1881 in that it deals with such aspects of the forest problem as administration of forest vigilance, cutting permits, conditions for pasturing, methods of
reforestation, prevention of fires, penalties for infraction of the law, etc. The major criticism of this law, according to Beltrán, is that it continued the practice of referring only to certain forests and not including private lands.

Near the end of the Nineteenth Century de Quevedo began to gain prominence in the field of Mexican forestry. Largely through the influence of de Quevedo, a series of events took place which might be thought of as the real beginning of a Mexican forest consciousness. In 1901 de Quevedo proposed the formation of a Junta Central de Bosques (Central Forestry Committee) which was created in 1904. At first, the members of the committee worked only with the improvement of the public parks in Mexico City and the investigation of nearby forests. The functioning of the committee was improved in 1908 with the establishment of the first forest nursery (vivero) in Coyoacán, now a suburb of Mexico City. The same year, the first forest school was established in Santa Fe, Tacubaya, and was staffed with French professors, as a result of de Quevedo's training in France. The following year, 1909, the Central Forestry Committee was dissolved by President Porfirio Díaz and a Bureau of Forestry was set up within the Department of Agriculture in 1910 under de Quevedo's direction. With the advent of the Revolution of 1910, virtually all forest activity ceased and it was not until the 1920's that de Quevedo
was able to renew his struggle for forestry reforms and legislation. The following chapter analyzes the reforms and de Quevedo's impact upon present day forest legislation in Mexico.
CHAPTER III

EVOLUTION OF FOREST LAWS AND POLICY: 1917 TO 1943

The indiscriminate use of Mexican forests during the pre-Revolutionary period depleted the national forest lands to a significant degree and resulted in erosion of the deforested areas and created potentially hazardous flood conditions. During the period 1910 to 1932, de Quevedo and his followers were actively trying to develop a firm forest policy and agitating for a forest law. In 1914, a forestry school was established in Coyoacán as a prologue to the organization of a full-fledged Federal Forest Service. In 1923, this school was moved to its present site, the National Agricultural School in Chapingo (26:14). De Quevedo organized the Mexican Forestry Society (Sociedad Forestal Mexicana) in 1923, which began the publication of Mexican Forestry (México Forestal). It seems evident that he, more than anyone else, was responsible for the Proyecto de Ley Forestal y de Arboledas, which later (1926), after many changes, became the Forest Law of Mexico.

While the Proyecto and the Forest Law of 1926 were to some extent derived from pre-Revolutionary legislation, much of the basis for the new law was found in the Constitution of 1917. Even though this Constitution makes little or no mention of forestry, **per se**,
Article 27 does consider "... the equitable distribution of public wealth and the conservation of the natural resources susceptible to appropriation. ..." It is generally conceded, moreover, that post-Revolutionary forest legislation has its bases in Article 27. Although this article appears to be largely concerned with the equitable distribution and development of resources in general, it "... contains the ideas, the principles, and, in some respects, the detailed items of all the laws about landholding that have been placed upon the statute books since 1917" (200:189). Further, it

... undertook to do three things: 1) to define and limit the nature of property; 2) to define the persons and other legal entities having the right to hold property; and 3) to devise a set of principles and, to some extent, a procedure for the solution of the agrarian problem (198:65).

The following section is a discussion of Article 27 as it pertains to forest resources.

**Article 27 as Basis for Forest Law**

The first paragraph of Article 27 established that while the nation ",.. has had and has the right of transmitting the control. .." of lands and waters within the territorial limits of the nation to various

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6 Interestingly enough, Estévez Gámez (65:270-71) states that one living member of the House of Deputies who helped in the writing of Article 27 of the Constitution confirmed the notion that no thought was given to regulation of the forest developments and that "natural resources" were considered to be minerals.
individuals, these resources still belonged to the nation. In other words, the nation could recall this control at any time by means of expropriation, although this might "... only be done for purposes of public utility and with indemnification..." (Paragraph 2, Article 27). The term 'public utility' referred to the development and utilization of the land (or its natural elements—forests, water, minerals, etc.) in a manner considered to be beneficial to society. It was upon this basis that under-utilized forest lands have been and are expropriated. Expropriated forest land has, for the most part, been for the establishment of ejidos, although some has been for the establishment of national parks.

Paragraph 3 stated

The nation will have at all times the right to impose upon private property the nature (character) that the public interest dictates, such as that of regulating the development of the natural elements susceptible to appropriation, in order to make an equitable distribution of the public wealth and to care for its conservation.

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7"Las expropiaciones sólo podrán hacerse por causa de utilidad pública y mediate indemnización" (Paragraph 2, Article 27 of the 1917 Constitution).

8 La Nación tendrá en todo tiempo el derecho de imponer a la propiedad privada las modalidades que dicte el interés público, así como el de regular el aprovechamiento de los elementos naturales susceptibles de apropiación, para hacer una distribución equitativa de la riqueza pública y para cuidar de su conservación.

For discussion of legal meaning of 'elementos naturales,' see Flores de Gortari (67:50-51).
In other words, the nation (government) was authorized by the Constitution to regulate land or resource development for public welfare benefit, even though it might be private property. As will be noted in subsequent sections of the present work, this tenet has come to be fundamental in virtually all phases of resource development, and often in minute detail.

Paragraphs 4, 5 and 6 referred specifically to minerals and waters; however, paragraph 6, in referring to both minerals and waters, seems to have been the precedent for much of the present Forest Law and its Bylaws. This paragraph indicated that in the matter of minerals and water, the dominion of the Nation was inalienable and might not be lost by prescription or exploitation by individuals, groups or corporations, but concessions might be granted by the Federal Executive in accordance with the regulations and conditions established by the law. It further gave the Federal Government the power to establish or abolish reserves by means of declarations in conformance with the law. These concepts formed much of the basis of the Mexican Forest Law.

9 The statement is worded as follows:

En los casos a que se refieren los dos párrafos anteriores, el dominio de la Nación es inalienable e imprescriptible y la explotación, el uso o el aprovechamiento de los recursos de que se trata, por los particulares o por sociedades constituidas conforme a las leyes mexicanas 'No podrá realizarse sino mediante concesiones otorgadas por el Ejecutivo Federal, de acuerdo con las reglas y condiciones que establezcan las leyes.'
Another tenet of paragraph 6 referred to mineral fuels and stated that "... neither concessions nor contracts will be granted, nor will those which have been granted be allowed to endure. ..." and that "... the Nation will carry out the exploitation of these products in the terms of the respective regulatory law. ..." The concept of governmental exploitation has been applied to forests in that the government has assumed control of forest management and the supplying of raw materials to the sawmill or manufacturer especially through concessions for the use of the forest materials. Significantly the government forestry employees and all other production, transportation and maintenance costs are paid by the industry (-ies) being supplied the raw materials.

Paragraph 7 referred to those individuals or groups having a legal right to hold private property and indicated the nature of those rights. The first seven fractions of this paragraph set forth the conditions under which Mexicans and foreigners might hold land and the rights of religious and charitable institutions, commercial stock companies, banks and communal groups. Fraction 8 declared null all transfers, sales concessions, surveys, etc. of land, waters and

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10 Tratándose del petróleo y de los carburantes de hidrógeno sólido, líquidos o gaseosos, no se otorgarán concesiones ni contratos ni subsistirán los que se hayan otorgado y la Nación llevará a cabo la explotación de esos productos, en los términos que señale la ley reglamentaria respectiva.
forests or woodlands that were transacted or completed either in violation of the Constitution of 1857 or otherwise illegally or during the period of December 1, 1876 until the Constitution of 1917. The remaining 10 fractions of paragraph 7 made no direct reference to forests or woodlands.

Thus, although Article 26 did not focus specifically on forest resources, it seems clear that the concepts stated are the legal and conceptual basis for Mexico's Forest Law.

Influence of Mexican Forestry Society

Throughout the forest literature, there is reference to the devastation being perpetrated against the forest. Ricardo de la Vega (209:9-10), one of a small group of men associated with de Quevedo, referred to it as "... immoderate forest destruction (which) constitutes serious danger to economic health and equilibrium of the country..." and as gangrene which corroded the land. There was, on the other hand, no reference to arguments favoring the then existing method of forest exploitation, although there must have been some. The writers simply continued encouraging the structuring of new laws which would have alleviated practices considered to be detrimental.

Among the influential forces, the Mexican Forestry Society came to be outstanding.

During the first years of its publication, México Forestal, the
official publication of the Mexican Forestry Society, was devoted largely to relating the necessity of regulating forest exploitation and to the idea of protecting the forests by severe restrictions on forest utilization. It continually expounded on de Quevedo's preservationist concept of conservation, and particularly against unregulated exploitation of forests for use by the railroads. It was instrumental in the establishment of a National Arbor Day in February of 1926 in an effort to build public support for forest conservation. Although the idea of tree nurseries was not new to Mexico, the Society called all the state governors together to solicit their support for creating nurseries in their respective states. Starting in 1925, much of the Society's energies went to urging the preservation of forests for the protection of river basins, establishment of gardens and parks in cities, municipios and states and in encouraging the Secretary of Public Education to focus more directly on the role of the tree in the teaching of children. These activities were oriented not only to protect the people and capital investment against the danger of floods, but also to educate the people in the concept of forestry. There can be no doubt that the Society was the prime mover in forest legislation and regulation.

**Mexico's First Forest Law**

The year 1926 saw passage of the first major forest law of
Mexico since several decades before the Revolution. This law was a much revised version of the Proyecto de Ley Forestal y de Arboledas which had been published in 1923. The Mexican Forestry Society considered the 1926 law as being unsatisfactory since it had suffered considerable revision from the Proyecto and thus the Society began to work for reform of the law (189:132). Nevertheless, the 1926 Law was the first major document regulating the modern forest industry. The following is a comparative analysis of the Proyecto and the Law that resulted.

After several pages of the first issue of México Forestal had been devoted to illustrating the necessity for a forest law in Mexico, the Proyecto de Ley Forestal y de Arboledas (hereafter referred to as the Proyecto) was published in the second issue (171:1-8). This projected law was perhaps the first exposition of de Quevedo's protectionist philosophy which was to prevail for the next two decades. Title I, Chapter I, Article I of both the Proyecto and the Law contained their objectives which were to conserve, restore, propagate and regulate the development of forest vegetation in Mexico. De Quevedo was more explicit in that his concern was indicated to be conservation and restoration of forests to maintain surface and subterranean waters. On the other hand, the Law included the formation and organization of technical personnel to carry out the task as part of its objective. The
following comparative discussion considers the most important facets of the Proyecto and the Forest Law of 1926 and its Bylaws.

**Basic Regulations Proposed by the Proyecto**

Title II, Chapter I contained the general dispositions in both cases; however, this section of the Proyecto contained 30 articles, many of which were very specific, while the Law of 1926 contained only four articles which dealt with general subjects, those individuals affected, those lands affected, and a definition of forest vegetation. All of these subjects were included in Title II, Chapter I, of the Proyecto along with no less than six articles which set forth very strict regulations on protected forest zones (zonas forestales protectoras). Article 6 defined protected zones as those in which it is of strict necessity to conserve and restore the forest vegetation "... in order to regularize the climate, to protect the soil or to maintain surface and subterranean water regimes." These protected zones were to be under the control of the Secretary of Agriculture and for no reason were they to be reduced for agricultural or speculative means that might endanger the forest vegetation. Article 8 of the Proyecto declares the following types of forest areas to be included in zonas forestales protectoras:

1. Watersheds of rivers, lakes and lagoons within federal jurisdiction and those outside of federal jurisdiction if they include two or more properties;
2. The margins or shores, banks and beaches of rivers, lakes, lagoons and coasts within federal jurisdiction and those streams that cross two or more properties even if they are outside of federal jurisdiction;

3. Basins, channels or alluvial fans (conos de deyección) that might produce inundations of populated areas, destruction of means of communications or agricultural lands or the improvement of soils;

4. Watersheds feeding springs that serve as water supplies for populated areas;

5. Forests near cities that serve for recreation and all other forests that because of their beautiful woodlands, picturesque perspectives and other natural beauty;

6. National parks;

7. Sand dunes or sand banks along coasts that make certain regions or settlements unhealthy, that prejudice agriculture or whose stabilization and reforestation is a necessity of public order;

8. Sterile hills and plains that for public interest it might be necessary to reforest;

9. Forests or forested lands the government destines for teaching purposes or for forest experimentation; and

10. Forests or lands necessary to be covered with trees as a strategic precaution.

Furthermore, Article 10 of the Proyecto would have empowered the Federal Executive to expropriate lands for the purposes stated above in accord with the dispositions of the Código Forestal de Procedimientos Civiles when those lands were not managed according to the precepts of the Proyecto. The Law, on the other hand, failed to include the idea of protected zones.
Articles 12 through 22 set forth the conditions for expropriation of forest land and those conditions by which the owner might regain all or part of the expropriated land. Article 23 introduced the concept of prohibitions (vedas), total or partial. Articles 24 and 25 defined total veda as the absolute prohibition of exploitation or development and partial veda as prohibition of some exploitation or development in forested areas.

One of the most important innovations, and one which is still in use in Mexican forestry, was introduced in Article 26 of the Proyecto. This was the use of the marker (martillo), a hammer embossed with the official stamp of the authorized forester. The use of the martillo was not mentioned in the Law, but Articles 162 and 163 of the Bylaws indicated that professional foresters in private service would be responsible for its use and trees could not be felled unless marked. The practice of clear-cutting (mata-raza) was prohibited by Article 27 of the Proyecto in 1) protected zones, 2) forest reserves, and 3) above altitudes of 1500 meters and lower areas of arid climate. The remaining four articles of Title II, Chapter I mentioned the use of fire, transportation and construction in forest areas—all in a negative sense. Hence, it would appear that this chapter of the Proyecto entitled "General Dispositions" might have been titled "Specific Dispositions and Protected Zones."

Whereas the Forest Law of 1926 made no specific mention of the
establishment of *vedas* and *zonas protectoras*, the Bylaw did.

Chapter X, Article 91 provided the mechanism whereby the Secretary of Agriculture was empowered to place a total or partial prohibition on development in forest lands for the sole purpose of conservation or restoration. Article 92 of the same chapter empowered the Secretary to establish protected forest zones, following technical studies, in a) forest lands contained in major watersheds and along the margins of lakes and lagoons on national property, and b) the forest near population centers, if it was of hygienic benefit to the people to do so. Articles 94, 95 and 96 set forth the conditions under which exploitation might be expedited in these zones.

Title II, Chapter I of the Law of 1926 contained only four articles, all of a general nature. They 1) noted that the conservation and propagation of the forest vegetation of the national territory were of public utility (see section on Article 27 of the Constitution of 1917), 2) indicated that this action was the obligation of all the inhabitants of the Republic, 3) stated that all forest property, public, municipal, communal or ejidal and private, was subject to the dispositions of this law, and 4) defined forest vegetation.

**Forest Reserves**

The Forest Law of 1926, rather than setting forth detailed specifications for protected zones, spoke only in terms of forest
reserves (Title II, Chapter II) while the Proyecto treated both protected zones (Title II, Chapter I) and forest reserves (Title II, Chapter II). The Law (Article 6) simply stated that

... the following will be considered as forest reserves:

I. All of the forest terrain contained in uncultivated or national lands, and

II. The forest terrains of private lands (property) that the Federation or States expropriate for this purpose in accordance with Article 27 of the Constitution of 1917.

Article 7 of the Law indicated that forest reserves could not be transferred nor were they subject to prescription, although they could be exploited or developed (Article 8) at the discretion of the Federal Executive after a study had been conducted by the Secretary of Agriculture. On the other hand, the Proyecto (Article 32) declared all lands within federal jurisdiction that are unfit for agricultural cultivation to be forest reserves, inalienable and imprescriptible. Article 33 of the Law, however, empowered the Secretary of Agriculture to declare as forest reserves of the nation whatever other national lands he so desired to be destined to conservation or restoration of its forest vegetation. Article 34 stated "... for the effects of this law, it is understood by 'forest reserve of the nation' all portions of the lands destined perpetually to conserving and restoring its forest vegetation." Just as Article 8 of the Forest Law of 1926 allowed for exploitation or development, so also did Articles 36 through 38 of the Proyecto. In these three articles, it was indicated
that exploitation in the forest reserves of the nation was to be affected in accordance with the management project (proyecto de ordenación) that was approved by the Secretary of Agriculture in accordance with the Law. If, however, there was no proyecto de ordenación, forest exploitation was subject to the forestry plan (plan provisional dasocrático) as approved by the Secretary of Agriculture. Furthermore, in the forest reserves of the nation, exploitation of its products with commercial or industrial ends could only be brought about by means of public sale in accordance with the dispositions of the regulations of this law. However, all commercial exploitation was prohibited in the National Parks, as well as any other type of cutting that did not have conservation as its raison d'être (Article 39). Furthermore, the Secretary of Agriculture was empowered to exchange any area of forest reserves of the nation for any other area in order to destine them as forest reserves (Article 40). Finally, Article 42 of the Proyecto indicated that the forest reserves of the nation could not be conceded to anyone for any use whatsoever.

Chapter I, Articles 1 and 2 of the Bylaws of 1927 dealt with the inalienability and the imprescriptibility of forest reserves. Specifically, Article 1 stated

...in conformity with that stated in Article 7 of the Law, the forest reserves are inalienable, only when fulfilling the requisite of the article of the proper law will they be able to be transferred, in accord with the bases that are fixed upon being declared transferrable.
Article 2 stated

... the forest reserves are imprescriptible. They are not subject to embargo nor to expropriation for reason of public utility. Neither may they be the object of mortgage, nor of inheritance tax, nor a duty on the transfer of real estate in favor of private owners.

In terms of exploitation and development of the forest reserves, Chapter II, Article 6 of the Bylaws made clear the legal basis in that it "... will be carried out by means of permits or concessions that are granted by the Secretary of Agriculture. ..." and in accord with the requisites of Article 7 as follows:

I. That a technical study of the region be made by the Secretary of Agriculture determining:
   A. the existing situation;
   B. the possibility of forest development without prejudice of lands, springs, streams or any other natural wealth;
   C. the determination of the nature of the developments and of the amount of exploitation possible;
   D. the natural and economic possibility of assuring the forest conservation and repopulation; and
   E. the suitability of granting a particular authorization to exploit.

II. That the authorization granting the permits and concessions in the region studied will be by Presidential decree in each case.

Provisions were also made for the cancellation of the concessions.

Fraction I of Article 12 indicated that sufficient cause for cancellation would be the expiration of the time stated in the decree or if the objective of the grant ceases to exist. Fraction II of the same article provided the mechanism for cancellation by the Secretary of
Agriculture due to decrepitude (presumably this refers to both standards and equipment), although it did allow the interested party 60 days to present a defense.

Article 15 of the Bylaws explicitly set forth the conditions of the decree granting the concession (the recipient of the concession was decided by public sale of the area to be concessioned) in agreement with Sections A through H:

A. Upon expediting the decree referred to in Article 7, Fraction II, the Secretary of Agriculture will fix the taxes charged against exploitation for the purpose of reforestation. These taxes will be calculated in proportion to the size of the area and the nature and the amount of the products.

B. When a concession is solicited, it will be published three times, at intervals of ten days, in the Diario Oficial de la Federación, as will be a notice of public sale for those who wish to obtain the respective concession, giving an indication of the taxes according to the previous section and determining the technical and administrative conditions to which the exploitation should be subjected.

C. The date of the sale will be fifteen days following the date of the last publication of the notice in the Diario Oficial.

D. The sales will be public and will be verified in the representative offices of the Secretary of Agriculture.

E. Tree plantings covered by the amount of the forest rights fixed in Section A will be legal plantings.

F. The bids will be made in writing, submitted in a sealed envelope and accompanied by a certificate of deposit in the Banco de México, its branches or in an institution authorized by the Secretary of Agriculture, in the amount of the rights of exploitation for one year as set forth in the notice of the sale.
G. The concession will be granted to the highest bidder having made and guaranteed the best offer in respect to the rights of exploitation.

H. The declaration of adjudication will be made by the office that handles the sale, but will not be placed into effect until after it has been revised by the Secretary of Agriculture. . . .

Chapter V, entitled "Of Other Developments in Forest Reserves," authorized the occupation of limited zones in forest lands after the completion of a technical study, for the purposes of establishing schools, public buildings, infirmaries, sawmills, wood products plants, water projects, railroads and roads which directly facilitated authorized forest exploitation, communication lines (telephone and telegraph), electrical lines, camp grounds and archaeological explorations.

Chapter III of the Proyecto was entitled "Forest Lands of Communal or Ejidal Property" (oddly enough, in the ten articles which follow, the term 'communal' was used only twice while the term 'municipal' was not used at all), Article 43 defined ejidal property as being in the nature of communal property and in the next eight articles of the chapter, forest lands of the ejidos were discussed. The last article of the chapter, Article 52, stated that for the effects of this law, the forest lands of the municipios might be compared to the forest lands of communal property; i. e., ejidal forests.

This chapter of the Proyecto first stated that since communal
lands were involved, the area under discussion could not be reduced in size—it might only be increased and it was the Secretary of Agriculture who was empowered to set aside lands for this purpose (Article 43). Article 44 provided that the land should be surveyed, planned and registered. Article 45 defined the portion of the ejidal lands that were to be considered forest lands as the land area that because of diverse conditions is improper for agriculture. Articles 46, 47 and 48 were essentially the same as Articles 36, 37 and 38 (see p. 42); the difference being that the latter referred to forest reserves, while the former referred to ejidal lands. Article 49 is very much a repetition of Article 43 though it makes specific mention of protected zones (zonas protectoras). Article 50 stated that unprotected zones in ejidal forests might be cleared for the purpose of agricultural cultivation and only if it did not result in creating wastelands or unproductive untilled lands.

Communal, Ejidal, and Municipal Forest Lands in the Law

In the Law, Title II, Chapter III of the Forest Law of 1926 and Chapter VI of the Reglamento provided the dispositions for the control of communal, ejidal and municipal forest lands. Articles 12, 14, 15, 16 and 17 were the most important portions of the Law in respect to these lands. Article 12 stated that the "...common forest lands are
of common usufruct in conformance with the prescriptions of the Ley Reglamentaria sobre Repartición de Terrenos Ejidales y Constitución del Sistema Parcelario o Ejidal. " While this article indicated the tenure conditions of communal forest land, Article 14 established that "Any area of land that because of its natural conditions is not proper for agricultural cultivation ought to be understood to be communal or ejidal forest land." Again, it may be noted that the Mexican definition of forest land includes any land capable of attaining a forest cover irrespective of whether or not it is in evidence at any given moment. Further, the concept 'forest cover' includes a very broad spectrum of plant types such as cactus, shrubs and herbs and some grasses.

Article 15 of the Law placed forest exploitation on communal or ejidal lands under the jurisdiction of the Secretary of Agriculture while Article 16 explicitly gave the commercial exploitation of these forest lands to "...cooperative organizations formed by the inhabitants of the place and which in all things will be subject to the dispositions of this Law and the respective Bylaws." This, then, was the fore-runner to the present day system of Industrial Forest Exploitation Units.

Chapter VI of the Bylaws of the Forest Law further defined ejidal, communal and municipal forest lands. Article 56 of the Reglamento stated:
For the intent of the Law and of the present Bylaws, it will be understood:

I. By communal forest lands, those that, considering the characteristics expressed in Article 5 of the Forest Law (Article 5 of the Forest Law defines forest vegetation as having a capacity to form a cover that protects the soil against the agents of degradation and dessication), guard or maintain the villages and those lands that have remained undivided to this date;

II. By ejidal lands, those that have been granted or restituted to the villages in accordance with the law of January 6, 1915 and the rest of the existing agrarian dispositions; and

III. By municipal forest lands, those that the municipios have acquired without violating Article 27 of the Constitution.

These lands apparently were considered to be within the same landholding regime since their administration was referred to only in terms of the ejidal lands. Article 58 of the Bylaws placed the administration of ejidal lands in the hands of the Administrative Committee or the Ejidal Commissariat which was to function in accord with the legal provisions that established such governing bodies.

Private Property

Title II, Chapter IV of the Proyecto entitled "Forest Lands of Private Property" contained seven articles, several of which were comparable to articles of the previous two chapters. Article 53 did not allow the reduction of forest lands on private property in 'zonas
protectoras' for any motive and stated that exploitation might be
effected only in accord with the forest regime determined by the
Secretary of Agriculture. Article 54 allowed non-protected zones to be
freely exploited and even reduced in size for agricultural or industrial
purposes if, in the judgment of the Secretary of Agriculture, the land
would not be ruined; i.e., converted to wasteland or unproductive,
untilled land.

Articles 55, 56 and 57 were equivalent to Articles 36, 37 and
38, and 46, 47 and 48 respectively, except that the studies (proyecto
de ordenación and plan dasocrático) would be formulated by owner
rather than by the Secretary of Agriculture. Another exception was
that Article 57 suspended unauthorized activities until they were
authorized. Article 58 gave the owner the perogative to cultivate
forest land not in a protected zone whether or not it was submitted to
a forest regime. This seemed to be a further statement of Article 54.
Article 59 granted certain franchises to private forest lands in pro-
tected zones and agriculture or non-agriculture lands in non-protected
zones when submitted to a forest regime. They were:

I. Tax exemption on the value of standing timber;

II. Rights of way (servidumbre de paso) and aqueducts
(canals) existing in the forest might be extended outside
the forest;

III. The right to forest guards, similar to those of the govern-
ment and subject to this law and its regulations; and
IV. The right to request cooperation of the technical service of the Secretary of Agriculture for formulation of the Proyecto de Ordenación and Plan Desocratico Provisional.

Article 18 (Title II, Chapter IV) of the Forest Law of 1926 indicated that all private forest vegetation was subject to the conservation criteria set forth by the Federal Executive and charged to the administration of the Secretary of Agriculture and to the Bylaws of the present law. The regulations were contained in Chapter VII of the Bylaws of the Forest Law, beginning with Article 70 which required the permission of the Secretary of Agriculture for the exploitation of forest vegetation on private property in accordance with the following fractions:

I. Permission will be applied for by the owner of his duly authorized representative or by the contractor accompanied by written consent verified by two witnesses.

II. Application will be accompanied by the original titles to the property or legally authorized copies. The Forest Service will demand presentation of exploitation plans except for areas of less than 150 hectares of forest land in cold climate or 200 hectares in humid climates. If the Secretary of Agriculture deems it advisable, he may grant the permit prior to the presentation of documents.

III. If the property is registered with a fiscal value of less than 1,000 pesos, a certificate from the Oficina Receptora de Rentas may be exhibited in lieu of title.

IV. If the annual products of exploitation are greater than 1) 2,500 m³ of madera corriente from cold climates, 2) 1,000 m³ of maderas preciosas from humid climates, 3) 75 tons of resin, 4) 20 tons of chicle, or 5) other products sufficiently important to merit judgment of the Secretary. A provisional exploitation plan formulated by a professional forester must be submitted.
If the annual products of exploitation are greater than
1) 5,000 m$^3$ of madera corriente from cold climates,
2) 2,000 m$^3$ of maderas preciosas from humid climates,
3) 300 tons of resin, 4) 100 tons of chicle, or 5) other products sufficiently important to merit the judgment of the Secretary, a proyecto de ordenacion will be formulated to be presented five years from the date of the permit.

V. The exploiting businesses whose annual developments are greater than 1) 15,000 m$^3$ of maderas corrientes from cold climate, 2) 1,500 m$^3$ of maderas preciosas from humid climates, 3) 1,000 tons of resin, 4) 200 tons of chicle, or 5) other products sufficiently important to merit the judgment of the Secretary, must include in the personnel a professional forester responsible to the Secretary to assure compliance with the plans and bases of exploitation.

Forest Regeneration

Title III of the Proyecto contained five articles concerned with forest repopulation. Article 60 stated that if lands within protected forest zones were found denuded or with insufficient vegetation, they were to be placed in veda by the Secretary for the purpose of spontaneous or natural forest regeneration without artificial reforestation. Moreover, if sufficient spontaneous or natural regeneration did not take place, the Secretary could order artificial reforestation. This could also be applied to lands not belonging to the Nation (Article 61). If the private owners referred to in Article 61 refused to comply with the orders of the Secretary, the Federal Government was empowered to expropriate those lands in accord with Articles 10 and
or Articles 15, 16 and 17 (Article 62). For the purposes of reforestation, Articles 63 and 64 provided for the establishment of tree nurseries in the Valley of Mexico, Mexican Territories and in each of the Mexican States.

Reforestation received a somewhat different treatment in the Law of 1926 and its Bylaws. Chapter V, Article 22 of the Law allowed the Federation or the States to expropriate land requiring reforestation for the formation of forest reserves and declared them to be of public utility. Article 23 empowered the Federal Executive to determine which zones ought to constitute these reserves and made them subject to special regulation. Reforestation was to be accomplished through the establishment of tree nurseries in local areas for reforestation or the institution of woodlands and urban parks (Article 28). Chapter XI, Article 99 of the Bylaws, declared reforestation to be of public utility in those lands that because of their situation were encountered in the following cases:

I. Deforested areas in protected zones;

II. Areas where water supplies were fouled due to deforestation; and

III. Areas where health and agriculture (planted fields) were prejudiced by dust clouds from soils and barren lands.

Chapter XII, Article 107 of the Bylaws treated nurseries in the following manner. "In order to attend to reforestation, as well as providing trees to parks and public gardens and promoting the
development and cultivation of fruit orchards, the Secretary of Agriculture will establish nurseries in cooperation with the local authorities. .." as follows:

I. The technical direction and the construction, supplying of seeds, plants and the necessary studies were charged to the Secretary of Agriculture;

II. The supplying of irrigated land and the elements necessary for establishing nurseries were charged to local authorities; and

III. The nurseries were to be dedicated exclusively to the production and cultivation of forest trees, ornamental and fruit trees.

Forest Protection

Forest Grasslands, Herbs and Shrubs

Title IV of the Proyecto was relegated to establishing 'special methods of forest protection,' Article 65 placed the control of the study and utilization of grasslands under the Secretary of Agriculture, while Article 67 stated that the Secretary "...will promote and regulate the development of irrigation waters in grasslands and will accord the adoption of means of protection of grassy woodlands or forest meadows." Articles 67 and 68 gave the responsibility of caring for the exploitation of herbs, shrubs, i.e., thickets, chaparral and other forest vegetation of arid regions, to the Secretary for the purpose of judicious development, obtaining natural regeneration and to avoid
their exploitation resulting in converting the area to "... useless wastelands or untilled lands or to uninhabitable deserts."

**Insects and Diseases**

There is no portion of the Law of 1926 nor of its Bylaws which specifically dealt with the topic of the preceding paragraph; therefore, the analysis will proceed to Chapter II of Title IV of the Proyecto. Chapter II of this section is entitled "Of Forest Plagues" which presumably includes both insects and diseases, though neither is referred to specifically. Articles 69, 70 and 71 charged the Secretary of Agriculture to conduct studies (investigations) of forest plagues and to indicate what measures were necessary to prevent and combat them. The local authorities were to lend any aid to the Secretary in the studies, the prevention and combat of forest plagues and the dispersing of any necessary knowledge. Furthermore, private owners were obligated to comply with the dispositions emanating from the Secretary in reference to this matter.

There was very little reference to forest plagues in the Law and Bylaws. Title III, Chapter II of the Law stated only that the Federal Executive, through the Secretary of Agriculture, would dictate "... the necessary means to prevent and combat plagues that might endanger forest vegetation." There seems to have been no mention of forest plagues in the Bylaws.
Forest Fires

This topic received greater coverage in Mexican forest law than most other topics. There were six articles pertaining to forest fires in the Proyecto, ten in the Bylaw and three or four in the Law. Title IV, Chapter III, Article 72 of the Proyecto required the express authorization of the Secretary of Agriculture, which may include precautionary measures to be taken prior to the use of fire in or near forest lands, whether they were forested or not (see Article 4 of the Proyecto for definition of forest vegetation). Any damages that occurred to bordering or neighboring properties as a result of the fire were the responsibility of the permit holder (Article 73). Articles 74 and 75 charged the Secretary of Agriculture with the duty of conducting studies on forecasting, extinguishing and impeding the propagation of forest fires--emphasis here was placed upon forests of resinous species--and indicated that local authorities were to lend any aid requested to the Secretary in regard to those studies, the dispensing of the knowledge gained from the studies, etc. (These two articles were comparable to Articles 69 and 70 in the section of forest plagues.) The railroads were singled out in Articles 76 and 77 as a major cause of fires and were obligated to take all precautions to prevent fires and to extinguish any fires they started.

In general, the Law has been shown to be more lax than the
Proyecto. However, in the matter of forest fires, the Law was perhaps more strict. Article 37 (Title III, Chapter III) of the Law states "In all forest lands and areas bordering them, the use of fire in a form that might propagate itself is prohibited." While there is a qualifier, 'a form that might propagate itself,' it is apparent that even this form of fire would have been allowed by the Proyecto, given the permission of the Secretary. This is slightly ironic in view of de Quevedo's concepts of forestry. It will be recalled that de Quevedo, a civil engineer, had been called upon to solve problems of flooding due to excessive forest exploitation. It is probable that forest fires were more devastating in this respect than over-exploitation.

Article 37 of the Law dealing with fire is further clarified in Chapter XV, Article 116 of the Bylaws which specified

The muleteers, drivers, travellers and, in general, whatever person might have to use or remain in a forest or forest terrain, will only make small fires in those places indicated by the Forest Service in the lands of national property and in those places that are determined for this use in communal, ejidal, municipal and private property by the respective proprietors or their representative in accord with the forest authorities--it being obligatory to clean the land of all the inflammable substances within a meter of the blaze and completely extinguishing the blaze upon termination of its use.

A fine of 50 pesos was to be levied upon the responsible person(s) for the infraction of this disposition.

Where the Proyecto mentioned only civil authorities as lending aid to the Secretary of Agriculture, Article 39 of the Law included
military authorities. It stated "In case of a fire in a forest region, all civil and military authorities are obligated to lend their contingents and the elements at their disposal for the extinction of the fire."

Article 121 of the Bylaws enlarged upon this statement by designating those individuals included, such as employees of the Forest Service, civil and military authorities and their personnel, proprietors, administrators and their employees, workers, renters, partners, and, in general, all persons residing within the property. Failure to comply would result in penalties being levied upon those people guilty of the infraction, even to the extent of cancelling an exploitation permit.

The Forest Service

Title VII of the Proyecto set forth the duties, obligations and authority of the Forest Service. Article 88 charged the Secretary of Agriculture with the responsibility of exploration, policing and vigilance of forest vegetation in Mexico (presumably this did not necessarily include private forest lands, since Article 93 allowed proprietors "...to sustain their own body of guards..." even though they were subject "...to the dispositions of the law and its bylaws"). As a consequence of this responsibility, the Secretary was to organize "...the technical offices of forest and woodland direction and of relative studies and the technical personnel for inspection and the forest guards." Article 89 provided that the Secretary would
establish forest schools, both in the Federal District and the States with the State governments' cooperation.

While the wording was different, Articles 41 and 42 of Title V, Chapter I of the Law were essentially the same as Articles 88 and 89 of the Proyecto. Chapter XVIII of the Bylaws of the Forest Law outlined the organization of the Federal Forest Service and placed it in the Dirección Forestal y de Caza y Pesca (Department of Forestry and Hunting and Fishing). Chapter XX of the Bylaws dealt with private forest services and Chapter XXI provided the details for the establishment of Forest Schools.

Penalties

The final section of the Proyecto, Title VIII, was titled "Of Penalties." It consisted of 15 articles, one of which had 19 fractions and two of which contained four fractions. While it actually said little of penalties, it did set forth numerous offenses and crimes\(^\text{11}\) for which penalties were to be prescribed. Presumably, had the Proyecto been adopted and passed into law, a set of bylaws would have been written which would have established the penalties for the various infractions of the law. Furthermore, much of Title VIII was

\(^{11}\text{In the Proyecto and the Law, 'offenses' were differentiated from 'crimes.' Offenses were of a minor character and generally incurred no more than 10 pesos damage. The Spanish word 'delito' is taken to mean 'crime,' while 'falta' is interpreted as 'offense.'} \)
redundant inasmuch as many of the offenses or crimes had been mentioned elsewhere, as were some of the penalties.

Title VI, Chapter I of the Law dealt with "Crimes and Offenses in Forest Matters" and contained more than 20 articles. The Law seems to have been more concerned with administrative details, such as who would levy the penalties and fines and what was to be done with the money from the collection of fines and sale of confiscated goods than with trying to halt them. Contrary to the comment in the previous paragraph, the Bylaws to the 1926 Forest Law contained no specific section dealing with infractions and penalties, though, as will be seen later, each successive law contained considerable material concerning this topic.

Taxes

As with most of the later laws, the Forest Law of 1926 embraced a section on taxes (Title V, Chapter I), although de Quevedo apparently did not consider them to be of sufficient importance to write them into his Proyecto. The Law established that commercial or industrial forest exploitations would be taxed on the basis of the value and amount of products extracted from the forest. The amount of tax was to be fixed by Executive regulation.
Transportation

One item that seems to have become of extreme importance in Mexican forestry which was not included in the Proyecto and was only mentioned in the Law of 1926 (Article 31), but which was treated in the Bylaws, was the matter of "Transportation of Forest Products" (Chapter IX). Three documents were required (and still are) for transportation:

I. Guía Forestal -- a document expedited by the Forest Service which contains the authorization for up to one year for the transportation of one forest product from one property and for one embarcation, be it rail, water or highway or for one destination such as a factory, a mine, etc.;

II. Orden Forestal de Remisión -- a document expedited by an exploiter having a Guía Forestal, with which the following is accompanied:
   a) the departure and passage of only one shipment of a forest product from the point of embarcation to its destination, whatever the means of transportation;
   b) the transportation of each shipment of a forest product, directly from the place of exploitation to the place of consumption or concentration;

III. Autorización de Reembarque -- a document which accompanies or allows reshipment (or a second embarcation), expedited by the Secretary of Agriculture (Article 79 of the Bylaws).

In other words, the Forest Service was to issue the Guía Forestal to the exploiter for the purpose of removing the product from his property by a single mode of transportation. The Orden de Remisión was to be issued by the exploiter, indicating the amount of shipment, its point
of departure and destination, and was to accompany the shipment (a way-bill of sorts). The Autorización de Reembarque was to be issued by the Secretary of Agriculture to allow a second means of transportation of the same forest product.

Chapter XIV of the Bylaws was devoted to the "Preservation of Wood." The apparent object of this chapter was to extend the usefulness of such wood products as railroad ties, posts (poles) for transmission lines, etc. Article 110 declared the establishment of wood preserving plants to be of public utility with legal franchises stipulated by the corresponding Secretary of State. It is suspected that this chapter was directed toward the railroad companies, since there was an extremely high demand for railroad ties, and as was noted by Tom Gill (81:37), in the first 15 years of the present century, called for 8 million ties annually. Since at that time the trend was toward utilizing only the tie and not the rest of the tree, it was important to increase the life of the tie.

Forest Register

Chapter XVII of the Reglamento stipulated that the Secretary of Agriculture would establish a forest register in which all forest lands would be registered. Article 138 required certain information about forest reserves such as the name of the reserve or forest, location and boundaries, class of forest, forest description, forest
developments and size. Article 142 required a listing of the titles of communal, ejidal, municipal and private properties, the provisional permits, authorization for exploitation, transportation documents for forest products and other data requested by the Forest Service.

An Evaluation of Forest Law and Policy—1917-1926

Thus, it is seen that the pattern was set for preserving and protecting much of the forest area by means of strict governmental control of all exploitation. It made little difference what the property ownership regime was; be it public, communal or ejidal, or private, all forest land or lands that might have sustained forests was to be placed in the context of the forest regime. Any commercial exploitation of the wood was to be conducted only by means of concessions or permits and in accord with the management project or the forest development plan approved by the proper authorities. It is interesting to note that Fraction V of Article 70 of the Bylaws required exploiters of private lands to hire a professional forester who would be responsible to the Secretary of Agriculture. As will be noted later, the suppliers of raw materials are now required to pay the salaries of an entire staff of foresters who are responsible to the Secretary.

Reforestation was emphasized in this early Law, not only of the lands presently being exploited, but also of lands that had been
deforested, especially if it was detrimental to the lands in terms of erosion, flooding, etc. For the purposes of reforestation, nurseries were to be established throughout the country. These nurseries would also have been used for establishing fruit orchards, parks and other public works.

Forest protection was a matter of great importance to the legislators and interested parties of the 1920's. This included the uses of grasses, herbs and shrubs, the irrigation of forest grasslands, and control of forest diseases and insects, and forest fires. While the Proyecto dealt with all these topics, the Law was primarily concerned with forest fires and was quite specific in its treatment of them.

The Proyecto, as well as the Law and its Bylaws, provided the machinery for establishing a forest service. Even the private forest services were subject to the dispositions of the law. Schools were to be instituted for the training of forest service personnel, such as forest guards, that they might be versed in the law and its regulations and various other aspects of forest care. A rather substantial section of both the Proyecto and the Law set forth penalties for infractions and how they were to be administered. In fact, it would seem that more emphasis was placed upon punitive measures than upon preventive measures.

The first indication of documentation for the transportation of
forest products appeared in the Bylaws to the Law of 1926. The purpose of the documentation was to prevent the cutting and sale of more than the authorized amount of timber. As will be noted later, this documentation has been improperly used by means of bribery and fraud; nonetheless, it still remains in use.

In general, the Proyecto while allowing for commercial development of the forest resources, tended to be very 'protectionist' in its attitude toward forest development. The attitude of the Law of 1926 and its Bylaws, while strictly controlling forest activity, was more oriented toward development. The law was strongly criticized by de Quevedo and his followers and subsequently was reformed, although de Quevedo considered the reforms to be insufficient. The reforms which were established were embodied in the Law of 1943 and its Bylaws.

Forest Law and Policy--1927-1943

A propaganda campaign against forest fires and destruction of the forests in general was begun in 1926, in part because of flooding in various parts of Mexico. The rationale was that a standing forest would halt much of the runoff from rainfall and thereby serve as a protective agent against the inundation of its river valleys. On June 22, 1926, the city of León in the state of Guanajuato suffered a major catastrophe due to heavy flooding, which the Mexican Forestry Society
saw as being largely a result of forest destruction. At the Fifth National Convention of Engineers which met that year, the Society pointed out the need for cooperation in forest hydraulics to avoid more disasters. They suggested that the previous inundation of the city of León in 1888 was less disasterous because of the smaller amount of forest exploitation which had taken place at that time. Many other activities were carried on by the Society in cooperation with private and public organizations throughout Mexico; however, there was apparently no law which resulted from these activities other than the passage of the first forest law since the Revolution, which, as was mentioned, the Society considered inadequate.

After only three years or so of its existence, the influence of the Mexican Forestry Society could be felt in the development of forest policy. Nonetheless, it was not until the late 1930's and early 1940's that a solid policy was attained. In the years immediately following 1926 and the passing of the Forest Law of 1926, advancements in the field of forest conservation and restoration were slow, yet the Society was constantly working for growth and development of a rational forest policy. In spite of the Forest Law which set forth the 'rules' by which forest exploitation could be carried on, it continued to be of an irrational, destructive nature. This was due in part to the lack of control over forest utilization from 1918 to 1926, a period during which the exploiters cut what they wanted and left the
rest on the ground (there seems to be particular reference to the railroads in this respect—29:25). It would appear that these exploiters simply saw no reason to comply with the law and the government either did not have the desire or was incapable of enforcing the law.

Roldán (189:132) suggests that the education of the public was continued through the consecration of the National Tree (El Arbol Nacional) and Arbor Day (Fiesta del Arbol) which was celebrated each year. The overall effect of the educational program was rather negligible as the vandalous destruction continued to be observed everywhere. Voracious forest fires occurred yearly and abuses of pasturing combined with them to exhaust the soil and to leave the center of the Republic susceptible to consequent inundations which tended to occur on an annual basis. Roldán further comments that defense of the forest against devastation was not considered by the government to be of the first order of concern as it should have been and that a parallel could be drawn between Mexico and the United States in that forests were used much faster than they were replaced. However, the United States had begun to recover more quickly through the creation of numerous specialized schools and making forest resource knowledge available in the primary and secondary schools. He also suggested that the latter may be related to the fact that the United States had been settled primarily by Northern Europeans who seemed to have had a greater sense of appreciation for the forests than had the Spanish who settled Mexico.
In the late 1920's and early 1930's, the campaign for a revision of the forest law and its regulations was intensified, especially a demand for regulation of the control of forest fires. The basic guidelines for official action of the subject of prevention and fighting of forest fires were stated in the Ley Forestal of 1926 and were improved by amendment in 1927; however, as Guillermo Gaitán (74:147) states, before the law could be successfully applied, the campesinos had to be taught what the law was about. As a result, in early 1931, the Mexican Forestry Society requested that the Secretary of Public Education begin a drive to teach silviculture in the primary and secondary schools as well as the normal schools (61:19).

Reforms of Law of 1926

There were modifications or reforms of the 1926 law, some of which were published as early as 1928--others were passed during the interim period between the 1926 and 1943 laws. These modifications included Article 6 which was reformed and later incorporated into the 1943 law in Article 14. Article 6, as indicated in an earlier portion of the previous chapter, contained two fractions which defined or stated that the following would be considered as forest reserves:

I. all the forest terrain contained in the uncultivated or natural lands; and

II. the forest terrain of private property that the federation of States might expropriate for that purpose as outlined in Article 27 of the Constitution of 1917.
In 1934, this article was reformed in that two further fractions were added. Fractions I and II were changed slightly. In the reform, Fraction I stated that the public or national lands with monte alto (see Glossary) that contained as many as 50 trees per hectare on the average would be considered as forest reserves. Fraction II was changed to indicate that public or national lands that had parklands (praderas arboladas) containing at least 40 trees per hectare on the average and that were found in zones of high local relief (zonas accidentadas) in large river basins would be considered as forest reserves. These two fractions in their entirety were included in the 1943 law. The third fraction stated that public or national lands contained in deforested watersheds ought to be included in the forest reserves, but that this required a Presidential Decree. This was a portion of Article 14 of the 1943 law, although it was slightly different. Fraction IV stated that deforested lands of private property in areas of high local relief ought to be expropriated in order to recuperate and ought to be placed in the forest reserves as established in Articles 24 and 25 of the 1926 law. This fraction was different in the 1943 law but was contained in Article 14. As can be seen, the law became more specific, terms were more carefully defined and less was being left to an interpretation of the law. It would seem that with this reform, more protection was being afforded to the forest lands of the nation, including those of private property.
Article 32 of the 1926 forest law was also reformed. In its original form, it stated that exploitation of woods for industrial or commercial purposes in which axes were used was to be prohibited and that the exploiters were obligated to use saws. The object of this Article was to cut down on the amount of waste because of the larger amount of material that was left lying in the forest due to the use of axes. In 1934, this law was reformed and made more explicit. Apparently, Article 32 was very difficult to enforce and it was difficult to bring about the rapid change that was requested by Article 32. The reform simply stated "The Executive (apparently Federal Executive) will be able to place in practice the methods he judges adequate in order to gradually halt the use of axes in forest exploitations and to substitute the use of the saw" (128:12). This article was not included in the 1943 law; that is, it had been deleted. Apparently, they realized by this time that the use of axes was necessary or the changes needed had already been accomplished. In fact, the author observed in some of his field observations that axes were still being used to the complete exclusion of saws. There is at least one case in which the ejidatarios working in the forest refused to utilize saws because the power saws and some of the other modern methods available to them would decrease the amount of work and, hence, the amount of their personal income. It would therefore appear that this particular article was considered to be unenforceable and was deleted in the 1943 law.

12 All subsequent Reforms of the 1926 Law and its Reglamento will be taken from this same source. The original forms of the laws are taken from references 90 and 91.
In its original form, Article 44 stated "Forest exploitation of a commercial or industrial character will result in a progressive tax which will be fixed in direct proportion with the value and amount of the products extracted in accordance with the respective regulations that the Executive dictates." In 1934, this law was reformed and was stated as follows:

Forest exploitation of a commercial or industrial character will cause taxes and rights (apparently this means use rights) that the laws fix or determine.

A special law that will be expedited by the Executive will determine the form and the terms of the taxes, having taken into account not only the fiscal aspects, but also the circumstances derived from the form, places, and conditions of the places in which the exploitation will be effected.

The laws, decrees and respective tariffs in accord with that disposed in Articles 3 and 4 of the Ley de Ingresos for the fiscal exercise of 1934 will require a referendum by the Secretaries of Agriculture and of Finance and Public Credit.

This article was placed in the 1943 law and became Article 55, but was again changed somewhat. The exact implication of the reform of Article 44 of the 1926 law was strictly one of taxation and has very little effect upon actual forest exploitation.

Another reform of the 1926 law was that of Article 69. It will be remembered that Article 69 was a part of the chapter which dealt with offenses and crimes in forest utilization. That law in 1926 stated that one-half of any fine was to go to the federal treasury and one-half was to go to the accuser, apprehender and the one who imposed the fine. When reformed, it placed a maximum amount that could be
received by the accuser and apprehender. The reformed version stated that of each fine, one-half was to go to the federal treasury and one-half was to be distributed to the accuser and apprehender, each one receiving an equal part. In no case was the personal participation to exceed 500 pesos. It further stipulated that the employees of the forest department (Oficina Central de la Dirección Forestal) were to have no right to participate in this reward since they were paid for doing this whether or not they accused or apprehended anyone. This article was reformed in 1928. It was changed again in 1943 and became Article 73 of the new law at that time.

Reforms of Bylaws of 1927

Concessions for Exploitation in Forest Reserves

There were even more reforms of the articles of the Bylaws of the Forest Law of 1926. Articles 3, 15, 63, 70, 79, 80, 121, 127, 128, 130, 131, 135, 136 and 173 were all changed in some respect between 1926 and 1934. Suffice it at this point to mention only those reforms that affected exploitation or protection of the forests.

Article 11 of the 1927 Bylaws dealt with the concessions for exploitation of the forest reserves and listed some 13 dispositions to which these concessions would be subjected. The reform of that article included three different fractions: Fractions II, VII, and VIII.
In its original form Fraction II indicated that there were only certain sizes of forest lands to be included in the exploitation concessions in forest reserves; 1) as much as 50,000 hectares in *climas cálidos* for the exploitation of primary or secondary products. A third note was added to Fraction II of Article 11 which stated that the Secretary of Agriculture was empowered to grant concessions for larger areas than previously, but only when they concerned unexploited secondary products such as resin, fibers, etc., whose development does not imply the destruction of the plant from which it is derived. The absolute date on which this fraction was added to Article 11 is unknown. It is suspected that the reform was most directly related to secondary products such as resins or fibers because of the larger areas that were granted, since larger areas were required for an economically feasible enterprise.

In its original form, Fraction VII of Article 11 stated that exploitation in forest reserves would obligate the concessionaire to pay annually in advance for the rights of exploitation an amount that was fixed in accord with Fraction A of Article 15. The reformed version of Fraction VII stated that the Secretary of Agriculture would fix a minimum quantity of products which the concessionaire would annually exploit and that he was to pay in advance for the right to this exploitation. The payment would be paid whether or not he exploited or developed this minimum quantity. Furthermore, if this minimum
quantity was exceeded, the concessionaire would so indicate to the corresponding forest official in the area and would pay the rights for the excess.

Fraction VIII of Article 11 referred to the rights of exploitation and indicated that when an exploitation concession was granted in areas of forest reserves, the concessionaire was to deposit in the Federal Treasury an amount equal to the annual right of exploitation. This fraction was reformed at the same time as the preceding fraction (Fraction VII of Article 11) and the reform version indicated that the concessionaire would make a deposit of guarantee that would be fixed by the Secretary of Agriculture, who would take into account the nature of the exploitations, the location of the forest, the amount of the annual payments fixed for the rights of exploitation and any other circumstances considered pertinent to the case. The amount of this deposit was never to be less than 25% of the rights that correspond to the minimum quantity of the products that the concessionaire would be obliged to exploit on an annual basis.

Legal Deforestation

Another article of the Bylaws which was reformed is Article 63. It is interesting to note that Article 63 allowed a form of deforestation without reforestation, one of the problems the country had tried to deal with effectively and one of the problems toward which the
forest legislation of the 1920's was directed. In this article, it was stated that when it was a question of felling trees on lands appropriate for cultivation for affecting clearings, the administrative committees or the ejidal commissariants, whichever the case may be, would solicit permission from the General Director of Agriculture for the felling of all trees in the area. Once the permission was granted the ejidatarios then were required to obtain the respective permits from the Forest Director in order to affect the destruction of the woods and also to obtain the necessary documentation for the transportation of these products. In the first case, where the committees or the commissariants solicit permission from the General Director of Agriculture, they were simply receiving permission to cut down all the trees in a given area without corresponding reforestation. In the second case, permission was being obtained from the Forest Director to conduct the exploitation and destruction of the woods in a particular instance. This article was reformed in May, 1932, but it did not actually change the substance of the article, rather it was an administrative revision which changed the use of terms or names. This same article also made some minor changes in administrative powers of the various branches of the Secretary of Agriculture.

Transportation Documentation

Article 80 dealt with the documentation and was reformed to
some extent, although not extensively. In its original form, the article stated that the expediting of the *guías forestales* was to be handled by the Secretary of Agriculture and other offices that were authorized to handle them. The proper use of the *guía forestal* required that the possessor exhibit or show it to any forest official desiring to inspect it. If requested, the exploiter must also exhibit the permit for exploitation. The *guía* was to contain the following information according to the original article:

a) the number of the *guía*, and

b) the name of the company or person authorized to make the remissions of the products.

This is followed by some ten other qualifications that were to be contained in *guía*; however, they were not changed from the original article.

The reformed version of the article, as in the original form, indicated that the Secretary would be in charge of expediting the *guías forestales*; however, it was changed to some degree: e.g., it had to be shown to any forest official upon demand. This included the authorization or corresponding permit for exploitation, plus evidence that he had deposited or guaranteed to the satisfaction of the Secretary's office a fine (deposit) that might be imposed upon him for exploitation or illegal transportation of the products with which he dealt or those in question. The *guía* should include the following data:
a) the number of the guía
b) the name of the company authorized to make remissions.

The remainder of the article remained the same as the original.

This reform was published in October, 1928. It was apparent that efforts were being made to halt illegal and clandestine operations in forest exploitation and transportation of forest products.

Article 87, which is also a portion of Chapter IX dealing with the transportation of forest products, was changed or reformed to some extent. Article 87 stated that the forest products that indigenous individuals exploited or introduced on a small scale or that they manufactured and transported to centers of consumption for sale did not require the respective guía, if they fulfilled the following conditions:

1) they were products provided by dead wood or the wastes of exploitation and they did not exceed the value of ten pesos at the market place,

2) the forest service, municipal or agrarian authorities certified a) the possessors of the products to be indigenous and b) the place of origin of the products for sale.

The reform version of the article published in October, 1932, stated that indigenous individuals who exploited, manufactured and transported forest products to the centers of consumption were authorized to do so upon submitting to the dispositions of the Secretary in accord with the following bases:

1) the exploitation and transportation of all classes of forest production was authorized;
2) the respective permits gave them the right to exploit and to manufacture weekly, forest products up to the value of ten pesos;

3) only if the permits were granted to the persons inscribed in the Registro de la Oficina Forestal in that particular jurisdiction; and

4) for no motive could guías de transporte be expedited to persons who traded in forest products acquired from indigenous persons.

The purpose of this article was undoubtedly an effort to halt clandestine activities and illegal exploitation and transportation of forest products.

Forest Fires

In Chapter XV of the Bylaws of 1927 entitled "Of Fires in Forest Vegetation," Article 121 was reformed in July, 1932. Article 121 dealt primarily with the fighting of forest fires and indicated those persons obligated to lend their services toward the extinction of forest fires. Those persons included such individuals as employees of the Forest Service, civil and military authorities, proprietors and possessors of forest lands, etc. This article, after the reform, became primarily a punitive type of article in that it indicated who would be expected to help. Actually, it was Fraction IV of the article that was reformed and this fraction deals with proprietors and possessors of forest lands that did not comply with the disposition contained in the previous fraction; i.e., they were obligated to help
fight forest fires. In event they did not comply, the permits, the guías and documents for transportation would all be suspended for these individuals. It would seem that this article is of minor importance; however, it does point out the emphasis placed on the fighting of forest fires as a protective measure and the fact that the Mexican government realized the tremendous forest devastation due to forest fires.

Other Articles Reformed

Articles 127 and 128 were reformed in 1928; however, these were very minor, such as the changing of one number to another. Article 130 was also reformed as were Articles 131, 135 and 136. All were reformed in 1928 and come under the general heading of 'Sanctions and Procedures for their Application.' They tended to be punitive types of articles in an effort to discourage forest destruction.

In the final chapter of the Bylaws, Chapter 22, which was entitled "General Dispositions," one article was added. This chapter began with Article 173 and an Article 173bis was added in February, 1929. This latter article stated that in accord with Article 45 of the Law, a deposit was to be made which amounted to 20% above the value of the product, if forest vegetation was to be destroyed or exploited with the end result being agricultural cultivation or industrial and that the deposit would only be demanded when dealing with forests in a cold
or temperate climate. This deposit could only be substituted by a surety bond of the general treasury of the federation. It further stated that, if within a term of two years beginning with the date of commencement of exploitation, the land was not placed in full aptitude of agricultural or industrial production, the deposit would then be entered in the Erario Nacional, or, in the case of a surety bond, it would be forfeited to the administration for whatever action was necessary to preserve the land, whether it be placing it in cultivation, placing it in industrial uses or whether it be reforested. These reforms were the only reforms noted by the writer; i.e., reforms of the 1926 Law and its Bylaws.

Other Legislative Action--1927-1943

Land Redistribution vs. Forest Problems

Although it was not a forestry law, the 1934 Código Agrario affected the forests inasmuch as it stimulated the division and redistribution of lands in Mexico. In so doing, the Código Agrario resulted in compounding forest management problems by allowing the division of the land into small parcels, each one to be worked by an individual family, or on a communal basis. It was not until 1943 that a new forest law was passed with which this problem could be adequately dealt.
Even though President Cárdenas, at the urging of de Quevedo, established the Department of Forestry, Hunting and Fishing as an independent department directly responsible to the President (since subordinated to Secretary of Agriculture), his primary interest was in land redistribution which entailed the aforementioned division of land into small parcels that tended to augment the abuses of the forests and make forest management more difficult.

Protection of Forest Legislation

The protective nature of forest legislation is particularly noted in the 1930's and 1940's. It was evident in the Proyecto and in the Forest Law and its Bylaws, but is most evident in the decrees and accords written by the various legislative and policy making bodies during the '30's and '40's. One of the first examples of this is a decree dated June, 1931 (128:111) which set aside a particular portion of the state of Sinaloa as a reforestation zone for which it was explicitly stated that no exploitation would be allowed. In August, 1931, a protected forest zone in which no exploitation could be carried out was established in the state of Veracruz (128:113). This was by Presidential Decree and was most likely directed toward the protection of the area from the effects of flooding rather than the preservation of the forest. A few months later, March, 1932, the Department of Forestry, Hunting and Fishing published an accord which established
a prohibition against forest exploitation on a specific property in the state of Veracruz because of the grave dangers to neighboring properties due to runoff (128:134-35). Later in that same year, a new accord established another protected forest zone in Veracruz (128:139), probably for the same reason.

During the few years preceding the second forest law (1943), there were more than 40 protected forest zones established in Mexico (13:69, 74-75; 93:1095-1250). Each of these zones was established by Presidential Decree or a decree of the Secretary of Agriculture.

In these zones, the decrees stipulated whether or not any exploitation could be carried out, how much and under what circumstances. Most of the protected forest zones were decreed by President Lázaro Cárdenas and during the time there was an autonomous forestry department under the guidance of de Quevedo.

What was referred to as a forest-hydrology zone was established in 1938. It encompassed a portion of the property of Tena de Huehuetoca in the state of Mexico. The purpose of the zone was irrigation; however, it was to be reforested as a measure of protection for the watershed (93:853-55). Exemplary of the protective attitude in reforestation was the Presidential Decree of April, 1938, which prohibited pasturing on lands subject to reforestation within the watershed of the Valley of Mexico as it had been determined that pasturing was detrimental to the growth of the young trees (93:842-44).
(Although it is not specifically stated, goats were probably the target of this decree, since there was considerable feeling among foresters against the pasturing of goats in forest areas because of their effect upon young trees.)

Whereas the law and its bylaws contained several statements regarding reforestation, it was normally referred to either as reforestation by the owners or reforestation to be carried out by the Forest Service under given sets of conditions. In March 1932, a decree was promulgated that stated the exploiter must reforest the species cut if natural reforestation was insufficient to do so (28:115). This decree was probably directed more toward the exploiters themselves, who, it was felt, did not assume the responsibilities of a commercial enterprise, than toward reforestation.

Protection against clandestine forest activity which would misuse transportation documentation or which would allow unauthorized exploitation was decreed in 1931. Although the decree was limited to the Distrito Federal, it indicated the concern for the proper use of the documentation. The decree prohibited the nighttime transportation of forest products by any form of transportation other than the railroads. Apparently the railroads were considered to be impregnable as far as the illicit use of documentation was concerned. By prohibiting nighttime transportation of these products, it was assumed that much of the clandestine activity would be halted (128:107).
Fires and Measures to Protect Against Loss by Fire

The use of fire to clear land for agriculture had for some time presented problems in forest conservation. In January, 1930, an accord was initiated by the Department of Forestry, Hunting and Fishing which contained regulatory dispositions affecting the use of fire. In accord with Article 37 of the Forest Law and Article 117 of the Bylaws, this directive stated before fire could be used for clearing purposes in forested areas, it was necessary to acquire a permit from the Forest Service. It also required a member of the Forest Service or a local municipal authority to be present at the time the burning was in progress. Further, it was necessary that the individual granted permission for burning to indicate his intention to the forest office, the municipal president of the jurisdiction and the proprietors of the surrounding lands so that they might take the necessary precautions (128:119-22).

Chapter III of the Forest Law of 1926 and Chapter XV of its Bylaws presented several dispositions dealing with the problem of forest fires and indicated who was responsible for combating them; however, they spoke only of individuals for the most part. An accord dated August, 1930, contained regulatory dispositions for the organization and functioning of Corporaciones de Defensa contra Incendios de Montes (128:122-31). According to Chapter II, Article 5 of this
accord, virtually anyone living in the vicinity of a forested area could be a member of a Corporación; however, Article 2 of Chapter I indicated that by preference, the Corporaciones were to be formed by campesinos and presumably, were to be manned by them.

**Cooperative Developments**

Article 16 of the 1926 Forest Law and Articles 60 and 61 of the Bylaws stated that exploitation on ejidos and communal property were to be handled by cooperative societies. Presumably, the cooperative societies were to be comprised of the campesinos who could receive technical help from the Forest Service, and would thereby gain more from the exploitation than if a large private organization was responsible for exploitation. In 1931, a decree was promulgated which directed that the exploitation of lechugilla (*Agave lechugilla*), a fiber producer, was to be exploited by cooperative societies in accord with these articles (128:108). It would seem that the importance of this decree was of a social nature and was indicative of the social character of forest exploitation.

**Forest Cooperatives**

A large part of the forest wealth of Mexico belongs to ejidos and communal communities but, for the most part, they have received very few of the benefits emanating from its exploitation. This has been
due to several factors; 1) agrarian communities have received very little help in the exploitation, either financial or technical, 2) intermediaries and contractors have worked these forests giving little or nothing in return to the landholders, 3) because of no return, campesinos have destroyed the forests to use the land for farming, and 4) government attempts to promote forest developments have been abortive.

Some Forest Cooperatives were established, but seldom functioned well. In 1936, the Banco Nacional de Crédito Agrícola began extending credit to campesinos near Uruapan, Michoacán; however, the lack of adequate technical direction caused problems as did ignorance of the application of forest credit. By 1939, a few Sociedades de Crédito Agrícola y Forestal were able to make payments against back debts, although for the most part, funds were not available to establish the Cooperatives. (In reality, by this time, 90% of all ejidal and communal forest development was in private hands and was operated for profit--136:271.) Even when funds were available, the Cooperatives were little more than a legal framework under which contractors could exploit the forest without personal responsibility (86:165). The investment of private capital in the Cooperatives was considered legal by Article 147 of the Código Agrario (136:281). Fortunately, for the campesinos and the conservation of their forests, the Forest Law of 1943 established a new system for exploiting ejidal and communal forests.
One of the innovations of Mexican forestry is the use of the marker or the 'martillo' to mark trees to be cut and the regulation that only trees officially marked may be cut. The marker was not mentioned in the Law of 1926, but it was given some consideration in the Bylaws of the Forest Law of 1926 in the following articles: Article 27, Fraction V of Article 30, Article 96, Article 162 and Fraction II of Article 163. Article 27 noted that no one outside the Forest Service would be allowed to use the marker for cutting trees, while Fraction V of Article 30 indicated that a record needed to be kept of any marking that was done. Article 96 made it mandatory to mark any trees to be felled in protected forest zones. In Article 162, the reference was to professional foresters utilizing the marker and Article 163 stated that the professional foresters would have to officially register the marker that he was to use. Articles 162 and 163 were in Chapter XX of the Bylaws which dealt with professional foresters exercising their profession in private service.

In 1932, the Secretary of Agriculture promulgated an accord (128:132-34) which consisted of instructions for the use of the marker. Again it was stated that the marker was to be used only under the direction of a professional forester who would be in charge of a given region, district or particular exploitation area. He could delegate
his authority, but he would still stand the responsibility for the marker being properly used. As the forester in charge, he would also be responsible for marking of at least two to three months supply of trees in advance for cutting so that forest exploitation would not come to a halt. This is of particular importance because of the wet and dry seasons. In much of Mexico, forest operations are halted for portions of the year because of wetness. Hence, if sufficient marking is not completed during the dry season of one year, it maybe that work will be stopped during the dry season of the following year while the forester is marking trees. The purpose of this accord was to improve the administration of the exploitation of forest resources and to unify systems and methods officially accepted for better application of the dispositions of the Forest Law and its Bylaws.

Taxes

One of the more important aspects of forest policy during the 1930's was the legislation affecting taxation. In late 1935 and early 1936, there were three major pieces of tax legislation: 1) a Presidential Decree establishing a tariff covering the rights of exploitation; 2) a tax law over the exploitation of the forests; and 3) the bylaws to the tax law. The decree dealing with the rights of exploitation covered only forests belonging to the federal government (93:159-63). These rights of exploitation were nothing more nor less than a tax
on the use of the forest. The rights, or the taxes, in the case of national forest lands, were to be placed in a specific treasury, the Tesorería de la Federación, and were to be used for forestation of bare lands or for reforestation. On the other hand, the rights of exploitation or ejidal or communal forest lands were to be placed in the Tesorería General de la Nación and were at the disposal of the Commissariats or the Directing Juntas representing the various ejidal or communal lands. It would seem that the rights of exploitation on different types of landholdings were to be used for different purposes, which, to some degree, expressed the social nature of the forest situation. This was particularly true in the case of the rights of exploitation on ejidal or communal lands. As indicated, the payments were to be placed in a special fund to be used as seen fit by the local governing bodies, which presumably meant that they might be distributed to the indigenous people living in those areas for their own uses.

The Ley del Impuesto sobre la Explotación Forestal, or Forest Exploitation Tax Law, grew out of the reform of Article 44 of the 1926 Forest Law (see p. 71). This law created forest yield taxes; i.e., forests were taxed only when they were harvested. Presumably, this was to encourage non-exploitation and, as a result, preservation. Furthermore, it did not levy exploitation taxes on indigenous people in conformance with the Forest Law and its Bylaws except for limits
set by the Secretary of Agriculture. This latter statement is found in the 1954 reform of the tax law. Estévez Gamiz indicated that this law had had extensive reforms by 1956 (22 in number) (65:221-22); however, Pérez Ortega indicates that by 1966 the law had been reformed only 16 times (167:75). Regardless of its reforms, the major content of the law is a listing of forest products and the amount of taxes to be placed on each. The Bylaw to this law was promulgated in 1936 and contained primarily definitions of terms and directives regarding payment of taxes and documentation for the movement of products.

**Railroad Ties**

In August, 1943, prior to the passing of the new Forest Law, a presidential decree was promulgated which provided the machinery for establishing commissions responsible for setting quotas of railroad ties to which the various exploiters of pine would be subject (65:216; 93:243-47). Although it is not specifically stated, the implication of the law is that exploiters of pine were not enthused about supplying railroad ties. Presumably, this was because other products were more profitable. It is interesting to note that prices for railroad ties varied according to the method of manufacturing. If they were manufactured using axes, they were cheaper than if they were sawed. Apparently, the philosophy was that since material
wastes were less if they were sawed, the government was willing to pay more to conserve on the amount of material wasted. It should be remembered that the Mexican railroads had been nationalized and therefore were government operated and constructed.

**Evaluation of Legislation--1926-1943**

The Mexican Forestry Society viewed the Forestry Law of 1926 as being inadequate. Over the next few years, several reforms of the Law and its Bylaws were instituted; however, most of the reforms only stated things more explicitly and contained no innovations. For the most part, the same can be said of new legislation prior to 1943.

It is interesting to note, however, that several protective measures were taken during the period following the passing of the first forest law of the Twentieth Century in Mexico. These measures included the setting aside of forest reserves, prohibited forest zones, protected forest zones and National Parks. While these measures were taken, ostensibly to stop forest destruction, exploitation permits could be acquired in each of them. Furthermore, these areas could not be protected from clandestine harvesting because they covered large areas of the country and trained manpower was not available to see them.

Forest Cooperatives were attempted, but because of the lack of technical skills, knowledge and credit, they were not successful, for
the most part. Moreover, the campesinos' lands had been exploited by private interests who gave the campesinos little in return.

Two new items of legislation included a Forest Tax Law and regulations requiring most exploiters to furnish a specific share of the ties needed by the railroads. One new law more explicitly outlined the use of the marker (martillo).

It was not until 1943 that a new Forest Law was promulgated. The Law of 1943 contained some of the reforms of the 1926 Law. With one exception the instituting of the Industrial Forest Development Units, it was very much a reiteration of the earlier law. The same might well be said of the Law of 1948. However, in 1960, a fourth Forest Law was passed which seems to have clarified many of the questions posed by the earlier laws. The following two chapters are concerned primarily with the 1960 law which currently (1973) is the Forest Law of Mexico.
CHAPTER IV

MAJOR TENETS OF THE EXISTING FOREST LAW

This chapter consists of a discussion of the six major tenets of the 1960 Mexican Forest Law. These six tenets are:

1) that government permits are required for all forest development;

2) that Forest Units may be created for technical and administrative control of forest developments;

3) that all trees for felling be marked by a government authorized professional forester;

4) that documentation must accompany all forest products upon being removed from the forest;

5) that forest utilization requires social responsibility; and

6) that failure to comply with regulation is subject to specific penalties.

Government Permits Required for all Forest Development

Historical Evolution of Permit Legislation

Forest exploitation permits have been required since 1861; however, until 1926, the permits applied only to public lands. Subsequent laws require that permits be issued for nearly all development
and exploitation, but only after **Forest Development Studies** are conducted and approved by the Office of the Secretary of Agriculture. While there are many classes of public and private land holdings, almost none are completely closed to development or exploitation. Nonetheless, the Official **Forest Service** endeavors to maintain an awareness of all forest activity, legal or otherwise, by virtue of being in charge of much of this activity through the granting of permits.

**Forest Law of 1926**

Variations in the wording of the law resulted in some problems in interpretation. For example, Article 8 of the 1926 Law indicated that **Forest Reserves** could be exploited only pursuant to a study conducted by the Secretary of Agriculture and the subsequent issuing of a permit. The **Bylaws** pertaining to exploitation of national lands and national parks (Articles 31 through 50) stated that these lands were open **only** to pasturing and for recreation and tourist uses that did not compromise the forests in any way. While Article 16 of the Law and Article 60 of the Bylaws subjected cooperative organizations formed by local inhabitants for exploitation of communal or ejidal lands only to the dispositions of the Law and its respective Bylaws, Article 61 of the Bylaws indicated that cooperative societies would be subjected also to legislative precepts and presidential dispositions and that they must be registered with the Secretary of Agriculture. Finally, Articles 66
and 67 indicated that permits would be required for commercial exploitation and communal lands.

Article 19 of the Law clearly stated that any exploitation on private forest lands required a permit. Articles 70 through 77 of the Bylaws set forth the requirements for obtaining permits such as presenting proof of ownership, information specified on permit petition exploitation plans, etc. Finally, it is interesting to note that while Article 77 referred to 'unit of exploitation' (unidad de explotación), it is not until 1943 that exploitation units became a major facet of forest development and conservation. Article 180 of the 1927 Bylaws defined 'unit of exploitation' as "... the forest land or lands that because of their natural conditions demand the application of a single exploitation plan."

Forest Law of 1943

The Law of 1943 also stipulated that permits be acquired for all forest exploitation (including pasturing, in most cases) other than very small scale developments (Articles 11 and 77 of the Law and 100 of the Bylaws). These permits required verification of surveys, boundaries, titles and power of attorney (Article 7). Exploitation could be carried out only for the collective benefit of ejidal and communal lands (Article 8) and only in respect to majority desires (Article 9). Although the Bylaws of 1944 were far more comprehensive
than previous laws in regard to forest development permits, little change was noted in reference to actual forest utilization. The articles of the various Bylaws were primarily administrative in nature; i.e., they dealt mainly with the submitting of permit or concession applications, approval of applications, the procedure and responsibility for notification of approval or rejection, persons or organizations to be in charge of various developments, etc. In fact, other than stating what kinds of development might or might not be approved on various types of landholdings, little overt effort was made in the law to influence forestry methods. It seems clear that the most significant change in the permit portion of the Law of 1943 was the more specific reference to the authorization of the Industrial Forest Exploitation Units (Unidades Industriales de Explotacion Forestal).

Forest Law of 1948

The format of the law was changed in 1948 and the requirements for permits were less explicitly stated. There were only three direct references to the authorization of forestry activities and, for all practical purposes, these were reiterations of previously stated laws. Article 2 required authorization for the cutting of wood. The

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13 It is interesting to note that while the law was published January, 1948, only a year later, January, 1949, 15 of its 68 original articles were reformed.
felling of trees in public urban places, in cemeteries or on cultivated land was subjected to the dispositions of the forest authorities. When reformed in 1950, this article included not only the cutting but also the exploitation and development. The felling of trees on private urban land was subject only to notifying the local forest authorities of the intent. Authorization was also required for opening new lands to cultivation (Article 5) and for exploitation or development of national forests (Article 8). In the latter case, the permit was to be granted by Presidential Decree (Article 8). Approximately one-fourth of the articles of the Bylaws of 1950 concerned the granting of permits or concessions for forest development; however, they were mostly of a procedural nature and offered very little direction affecting future forest utilization.

**Forest Law of 1960**

The format of this new law was changed back to the earlier version and upheld the necessity of applying for exploitation authorization. This law presented little new in Mexican Forest Policy, although it appeared to be more explicitly stated than in previous versions. The activity in the forest was still rigidly controlled and virtually all forms of exploitation and development required permission from the Secretary of Agriculture (Article 198--Bylaws). "The clearing of land covered with trees or shrubs in order to open new lands to
cultivation or animal husbandry. . .." is not to be permitted if the slope of the land is greater than 15%, and then only if "...the soils, by depth or quality, permit permanent use to be made of them with greater economic benefit than might be obtained from forest development" (Article 44). Any permit would be granted only after complete studies had concurred with the above requirements (Article 45). Article 46 stipulated that the form and time of the clearing would be fixed in the permit, as well as the setting aside of vegetation for windbreaks, "...protection for watersheds and to further the conservation of the soil and water." Since limitation and control of pasturing was considered advisable (Article 47), the Forest Authority was authorized to delimit forest areas in which pasturing might be permitted or prohibited and it was indicated that fences should be constructed (Article 48). Article 133 of the Bylaws listed certain areas in which permits to pasture were required while Article 135 stated that permits were necessary for pasturing on private land. Article 129 of the Bylaws noted that pasturage permits would only be granted "...on private lands contained within protected zones or forest reserves...when the Secretary of Agriculture feels the conservation of forest resources and the protection of watersheds is fully guaranteed." Article 224 (Bylaws) noted that permission from the Secretary of Agriculture was required when communal or ejidal lands associate with private lands to form a more viable forest development unit.
Permits in Prohibited and Protected Zones

The decreeing of prohibited zones, protected zones, forest reserves and national parks and their exploitation was not new to the Forest Law of 1960 and its Bylaws; however, by this time it had been realized that forests could suffer from over-protection as well as over-exploitation.

Prohibited Zones

Prohibited zones could be established when silvicultural conditions demanded it, but only after forestry, economic and social studies had been conducted by the Forest Service (Article 52), and a Presidential Decree was promulgated (Article 53). Besides protecting the vegetation and regulating the rights of way in prohibited zones, the Forest Service was to control the harvesting of deadwood and cultural and improvement cuttings (Article 54). If a stable industry had been organized, the Federal Executive could lift the prohibition, totally or partially, when convinced the industry would rationally develop and conserve the area (Article 55).

Protected Zones and Forest Reserves

While it was considered advantageous to set aside certain other areas as protected forest zones (Article 56), it was also established
that forest development would be allowed on them depending upon the particular conditions of the property (Article 57). Further, development would also be allowed in the national forest reserves (see Glossary) following the satisfactory completion of forestry studies and the expediting of an Executive Decree to that effect. This type of development would be done only under official direction (Article 60). These national forest reserves would be indicated following the conclusion of the National Forest Inventory and could only be utilized in "...case of necessity for the supplying of required forest products for the dependencies of the Federal Government or for public works and services..." (Article 61). Exploitation of forest reserves would be carried out by the State in which they were located.

National Parks

Article 62 provided for the establishment of National Parks which could contain land of any juridical regime of property (Article 65). While some forest developments might be allowed, only the Forest Authority could carry them out and would solicit laborers from the campesinos living in the area (Article 67). Also, any other type of development in National Parks (lodging, recreation centers, restaurants, etc.) were subjected to a permit which would be issued by the Forest Authority (Article 69).
Ordinary Developments

Chapter 3 of Title V of the 1960 Forest Law deals with what is considered as Ordinary Developments, such as small scale developments (less than 50 m$^3$ in roundwood of Maderas corrientes and 25 m$^3$ in roundwood of Maderas preciosas and those destined to 'works of collective benefit'). These require only being marked, while commercial developments which exceed those limits require forestry studies and permits (Article 97). Even though domestic or small scale commercial developments of herbaceous plants would not require authorization, the latter would call for advising the Forest Authority and paying the corresponding taxes (Article 98). Article 99 stated that for development of oils, seeds, roots and other products of the plant which do not endanger the plants, authorizations were not necessary. Other developments, such as utilizing the bark of the tree demanded a permit (Article 100) or that of removing the topsoil (humus) would be allowed so long as the fertility of the remaining soil was not endangered (Article 101). Even the establishment of various installations, such as plants, mills or shipping facilities require permission from the Forest Authorities (Article 121).

Communal Lands

The Forest Law of 1960 barely mentions the communal situation
in regard to the granting of permits for exploitation or development. The apparent procedure is for the Federal Executive to organize the communal groups in such a manner as to "... obtain the direct development, in benefit of those ejidal groups and indigenous communities, of those resources and of their own property, granting them technical assistance and financial help. "... and that "... the indigenous communities and ejidos may associate with private owners of forests in order to constitute Management Units or Industrial Forest Units" (Article 95).

Control of Forest Management Assured by Concessions to Commercial Forest Units

Probably the most notable effects of Mexican forest legislation have been the creation of the forest units to:

1) bring together small and diverse types of landholdings under a single management system;
2) act as a sustained source of supply for wood industries; and
3) give the Federal Government greater control over forest activities in an effort to halt the wanton destruction and to rebuild the forest portion of the National Patrimony.

They are now of three kinds; however, the Forest Law of 1960 and its Bylaws (and those laws prior to 1960) only allowed for two kinds of units; 1) Management Units, and 2) Industrial Forest Exploitation Units.
(The third type is the Decentralized Public Organization which will be discussed later.)

The first reference to Units was in the 1926 Forest Law; however, at that time it was a general reference to 'units of exploitation.' These were defined as "... the land or forest lands that because of their natural conditions, require a single plan of exploitation" (Article 180 of 1927 Bylaws). This was refined in the 1943 Law to include two kinds of units: 1) Industrial Forest Exploitation Units, and 2) Forest Exploitation Units.

Industrial Forest Exploitation Unit

Article 6 of the 1943 Forest Law indicated that the Industrial Unit would be for the purpose of supplying primary materials to a specific industry. It was further defined in Article 272 of the Bylaws as being to bring together different landholding regimes under a single exploitation plan. This seems to be the same definition under which the Industrial Forest Unit operates at the present time. They operate as a forest concession granted to a particular industry(ies) which receives the total harvest of the Unit.

Management Unit

The Forest Exploitation Unit of 1943 was the Unit of Exploitation found in the 1926 Forest Law and apparently became the Management
Unit in the Bylaws of 1950 (Article 42 and 147). This term was not clearly defined in 1950, but in the 1960 Forest Law, it was established for the purpose of improving the forest yield (Article 106). The 1960 law also indicated that while Management Units might function individually or in association with other Management Units, the Industrial Concessions must include one or more Management Units.

Marking of all Trees to be Harvested is Required

As was previously noted (Chapter III, p. 87), the Forest Law of 1926 made no mention of the marker, a hammer-like tool on the head of which is embossed the initials of the Forester in charge of exploitation and the number of the marker. It was cited, however, in the Bylaws of 1927 (Articles 27, 30, 96, 162 and 163). In the Forest Law of 1943 it was briefly considered, but only in reference to infractions of the law. However, in 1932, an accord had established the rules governing the use of the marker (see Chapter III). The purpose of marking the tree is three-fold:

1) To allow a knowledgeable person to upgrade the forest by leaving good seed trees and marking some of the less desirable trees;

2) To facilitate a re-evaluation of the forest for purposes of adjusting the exploitation plan; and

3) To provide a check and a record of species, location, size and quantity of trees harvested.
Responsibility of the Forester in Charge

To provide control of forest harvesting, all trees to be felled must be marked by the authorized Forest Service personnel, with the exception of clear-cutting allowed under special circumstances. In the case of clear-cutting, trees delimiting the area are marked. The Technical Director of the Unit is responsible for the use of the marker, even though he may delegate his authority to one of his subordinates. Certain constraints which must be observed by the marker are noted in the Forest Development Study. These constraints are in reference to authorized volumes, trunk diameters and species to be felled.

Placement of the Marks

Fraction VI of the 1932 accord indicated that while trees may be marked for felling, seed trees must be left standing in the forest. Fraction VIII states that trees must carry two marks; one at breast height and one at the very base of the trunk so that the stump will show the mark after the tree has been felled. It was further stated that all marks should be oriented in the same direction to facilitate being seen. In some cases, it was not required to mark hardwoods (128: 132-34).
Transportation Documentation is Required for Removal of Products from the Forest Unit

The overwhelming forest destruction and reduction in overall forest areas of Mexico called for some drastic actions to conserve what was left. One measure was to write into the law the requirement of forestry documentation for transportation. This first appeared in 1927 and, except for some minor changes, has been retained in all subsequent laws. Transportation documentation is to accompany all forest products in transit outside the property from which they are derived.

Specific Documents

Article 79 of the Bylaws of 1927 allowed for the use of three different documents. In the Bylaws of 1944, a fourth document was added; while 1950 saw the addition of a fifth document (Remisión de Depósitos) and a name change for two existing documents. The Remisión de Monte and Remisión de Depósitos were apparently used together in certain cases. This would seem to be an attempt to more clearly define the uses of documentation. The Bylaws of 1960 created two new documents, but they are local in nature and are of lesser importance. The fifth document added in 1950, the Remisión de Depósitos, was deleted, but the other four were retained, although some names were again changed (see Table 1).
Table 1. Documentation utilized in the Twentieth Century and expediting agency.\textsuperscript{a}

<table>
<thead>
<tr>
<th>Document</th>
<th>1927</th>
<th>1944</th>
<th>1950</th>
<th>1960</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guiá Forestal</td>
<td>3</td>
<td>1, 4, 5</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Orden de Remisión</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remisión de Monte</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remisión de Depósitos</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remisión Forestal</td>
<td>6</td>
<td>1, 4, 5</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Permiso General de Reembarque</td>
<td>5?</td>
<td>1</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Autorización de Reembarque</td>
<td>2</td>
<td>5?</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Certificado de Explotación</td>
<td>?</td>
<td>?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{a}Numbers refer to the expediting agency as follows: 1 - General Director of Forestry and Hunting; 2 - Secretary of Agriculture; 3 - Forest Service; 4 - Agencies of the Secretary of Agriculture; 5 - Agencies authorized by the Secretary of Agriculture; 5? - Assumed to be 5; 6 - Exploiter or contractor; 7 - Forest Authorities; ? - Unknown.

One other document was noted in the Bylaws of 1944 and 1960. This was the Certificado de Explotación and is necessary for the exportation of forest products. This certificate indicates that the material it accompanies was duly authorized for exploitation.

Purpose of Documents

The most obvious reason for the use of documentation was for better control over the exploitation of forest resources. Since these documents were issued only by authorized agencies and only to authorized persons or companies, it could be assumed that anyone...
found transporting forest products without documentation was doing so clandestinely and might be punished accordingly. In spite of the documentation and rigid controls governing their use, clandestine activity in the forest continues. Hinojosa Ortiz indicated that even the documentation became the object of illegal activity in that documents have value and are bought and sold (112:39-40). A second reason for their use was for accurate record keeping which would allow interested persons and agencies knowledge of just how much forest exploitation was authorized and carried out.

**Forest Law Requires Social Responsibility of Concessionaire**

As with most Mexican legislation based on the Constitution of 1917, forest law tends to be highly oriented toward social goals of the country. Indeed, much of the Mexican forest problem is social in nature and this may even be more true today than it has been in the past because of a much larger population and a high rate of population growth. In an effort to solve some of the social ills of the Nation, the Forest Law imposes certain requirements upon holders of forest exploitation permits to provide social amenities not otherwise found in the forest zones.

**Regulations Providing for Social Services**

Three articles of the 1960 Forest Law regulate the provision of
social services in the units of exploitation. Article 67 states that only the Forest Authority may carry out developments in National Parks and that they must employ the campesinos resident in the area. Article 88 goes one step further in that holders of development permits must give employment to the residents of the zones in which they operate. Fraction IV of Article 107 indicates the requirements of the Industrial Forest Units. It states that the applicants must fulfill the following requisites:

They will remit a project for establishing camps and contracting the workers, giving preference to the owners (possessors) of the land, as well as the construction of roads, centers of 'trabajo y luz,' schools, athletic fields and others....

These requirements are further reinforced, in most cases, in the Presidential Decree creating the Units. Fraction IV of the Considerations in the Decree which created the Unit of the Forest Company of Oaxaca states "...freely furnish, for the workers living in the camps, houses, medical services, water, light and electric power, to construct schools, sports facilities and, in general, all services required. ...(93:738-39).\footnote{Mexican Forest Law is Strongly Punitive and Provides Specific Penalties}

While the current Mexican Forest Law was designed to

\footnote{For further examples, see 93:608, Boxques de Chihuahua; 93:637, Triplay y Maderas de Durango; 93:647-48, MIQRO; and 93:664, Michoacana de Occidente.}
encourage forest development (Article 3) and an equitable distribution of forest wealth (Article 2), it is at the same time, still punitive in nature. That is, it stresses the necessity of carrying out developments to the letter of the law or suffer the expense of fines or imprisonment and/or suspension, cancellation or revocation of development or exploitation permits. Almost one-fifth of the articles in the four forest laws of this century are relegated solely to the subject of crimes or offenses in forest matters, while in many of the other articles there are also references to infractions. On the other hand, the Bylaws are much more of a procedural nature and reveal far less concern with punitive measures. Mexican Forest Law is both regulatory and punitive and would seem to give the Federal Government more than adequate control over the exploitation and use of forest resources.

Penalties

The penalties imposed by Mexican forest laws and regulations do not seem to be overly harsh in most cases. They vary from 50 to 20,000 pesos fine, 3 days to 10 years in prison and confiscation of all equipment depending upon the severity of the offense. At the present exchange rate, the maximum fine would only amount to 1,600 dollars U.S. One case in which the fine might be considerably heavier is found in Fraction I of Article 134 of the present law. The penalty for
destruction of isolated trees without a permit ranges from 50 to 1,000 pesos according to the size and species of the tree, or in the case of the destruction or ornamental trees in urban zones, the maximum penalty will be assessed. It is conceivable, therefore, that some fines might be larger than 20,000 pesos.
CHAPTER V

ANALYSIS OF THE INFLUENCE OF LAWS AND POLICY ON TWENTIETH CENTURY FOREST UTILIZATION

Little change in Mexican forest utilization occurred during the first three decades of this century. Forest destruction remained at a high level, exploitation continued to be irrational and little or no official effort was made to regulate forest activity until 1926. De Quevedo and a small group of his followers (the Mexican Forestry Society) had struggled long and hard to see these problems corrected, and were disappointed by the lack of acceptance of their Proyecto' with the passing of the Forest Law in 1926. These men continued their fight and succeeded in achieving some reforms of the law, but most important was the establishing of what Beltrán referred to as "... ill-fated results of the romantic attitude of 'amor del arbol' and the consequent restrictive policy toward forest activities. ..." (17:III). This romantic attitude became pervasive in the minds of the makers of Public Policy--so much so that the mere damaging of a tree was often considered to be anti-Mexican. Yet, it seems not to have permeated the larger portion of the rural population.

Moreover, the establishment of protected and prohibited zones to some degree resulted in further destruction of forests, rather than preserving them. By the late 1930's, there was an incipient recognition that over-protection was tantamount to unregulated and often
illegal over-exploitation and that if the forests were to continue to serve the Nation, the existing policy would have to be changed. The Forest Law of 1943 exhibited this interest by introducing the concept of the Industrial Forest Exploitation Units; yet this was not sufficient to completely rectify the situation.

Analysis of the influence of laws and policy on forest resource development in Mexico has revealed three basic results.

1) The requirement of permits has given government indirect control of forest development.

2) The legal machinery to establish exploitation systems has strengthened direct government control of forest and forest lands.

3) The strict requirements of the laws have affected forest resource quality.

Permits Allow Government Indirect Control of Forest Lands

With the exception of small scale exploitation, or exploitation of certain herbs, oils, fruits, roots, seeds and similar products, permits must be acquired prior to exploitation (Articles 97, 98 and 99 of the Law and 198 of the Bylaws). These permits are expedited only upon the completion of applications and the fulfilling of specific criteria. Moreover, the permits express precise conditions under which they will remain in effect.
Granting of Exploitation Permits

The granting of an exploitation permit for an 'ordinary' development is contingent upon several elements with which the applicant must comply. Notwithstanding the importance of the information contained in the application, Article 104 of the Law makes it definite that clear titles or proof of possession of the land is imperative and must be submitted with the application. Moreover, maps showing the boundaries of the forests to be exploited and forest development plans which meet the requirements of the Bylaws must also be submitted.

The application is submitted to the local forest authority who in turn refers it to the higher authorities. Fraction I of Article 200 of the Bylaws indicates what information must be contained in the application as follows:

a) Name and address of the interested party,
b) Name, size and boundaries of the property to be exploited,
c) Name of Municipio or State where property is located,
d) Amount of capital to be invested,
e) Quantity and class of products to be exploited, and
f) The organizational programs of work and the stages of development.

Fraction II of the same article indicates what documents must accompany the application. Besides those indicated in the previous paragraph are:

a) Record of nationality of interested party,
b) Accreditation of forester in charge of forest development study,
c) Contract between applicant and forester to be responsible for the exploitation,
d) Written assurance from forester (item c above) that he will carry out his commitment fulfilling the requisites of the Forest Law, its Bylaws and the dispositions of the Secretary of Agriculture.

Once the correctly completed application and the accompanying documents are submitted, the Secretary of Agriculture may proceed to complete the process of authorizing or denying the permit.

**Conditions and Enforcement Aspects of the Permit**

Indirect government control of forest lands under 'ordinary' developments is gained through the permit by virtue of the conditions stated therein. Those conditions include the following (Article 201 of Bylaws):

a) Name and address of the permitholder,
b) Class and duration of the permit,
c) Type of development and degree of industrialization of products,
d) Location and delimitation of the properties included,
e) Methods for prevention and combat of fires,
f) Methods and works of reforestation,
g) Methods of vigilance and other steps for protection to be maintained,
h) Rights of exploitation, and
i) Name and residence of the accepted responsible professional forester.

Failure to comply with any of the stipulations of the permit is due cause for suspension or cancellation of the permit, thereby giving the government considerable control without direct interference in the operation of the development.
In Mexico, there are four legally recognized exploitation systems:

1) Industrial Forest Exploitation Units;
2) Forest Management Units;
3) Small private companies operating with permits; and
4) Decentralized Public Organizations. The latter was not provided for in the 1960 Forest Law, but was created later by decree. In addition, there are thousands of individuals who legally and/or clandestinely harvest trees and sell the timber in the local villages or wherever they can find a market.

**Industrial Forest Exploitation Units**

The Industrial Forest Exploitation Units had their inception with the promulgation of the Forest Law of 1943, although about two years elapsed prior to the establishment of the first Unit. The basic philosophy underlying their origin is multi-faceted:

1. They facilitate government control of forest management;
2. They bring small properties together under a single management system which allows more rational development of the forest lands;
3. They allow proprietors of forests to conduct exploitation with technical direction and financial assistance; and
4. They provide a sustained supply of raw material for large industries.

While the foregoing has been termed a philosophy, implicit within it is a statement of purpose of the Industrial Units. Article 106 of the 1960 Forest Law indicates that the purpose is two-fold: 1) to obtain a better forest yield, and 2) to produce raw material for an industrial plant. It noteworthy that the former applies to the Management Units while the latter does not. Industrial Units may be established either at the desire of the government authorities or as a result of promotion by interested parties "...in order to supply raw materials to industries of national importance" (Article 22, 1960 By-laws). Also of interest is Article 226 of the Bylaws which states that each Industrial Unit will consist of "...one or more Management Units capable of satisfying in a regular and constant form the necessities of consumption of forest products..." for those companies with which they have associated themselves.

Government Has Technical Control of Forest Management

In the organizational structure of the units, the responsibility for silvicultural management of the forests is completely removed from the industrial aspects. The government assumes the obligation
for rational development of the forest and all that it entails; such as, reforestation and propagation of the forest, investigation and experimentation with forest species, cutting systems, and other management procedures, and an equitable distribution of public wealth.

The organization of the Industrial Unit includes a professional forester as the Technical Director who is appointed by the government and is charged with the responsibility of the entire forestry operation. His authority stops only when the raw material reaches the plant, sawmill or factory.

Figure 1 is a chart of the general organization and duties of each level of the organization for Industrial Units. Figure 2 presents a model of the Office of Technical Direction of the Industrial Unit. While these figures represent the Industrial Forest Exploitation Unit of Michoacana de Occidente, they closely approximate those of other units.

The relationship between the Technical Forest Direction of the unit and the industry or industries is basically one of supplier and consumer (see Figure 3), in which the supplier is responsible for all works of conservation, renovation and protection of the resource in all its ramifications, while the industry is responsible only for manufacturing or processing the raw material, minimizing its wastes, control of effluent, etc. The Office of Technical Direction may rightly be considered as an arm of the Federal Government, although it is the
Figure 1. Chart of organization and duties of each level of forestry portion of Industrial Forest Exploitation Units.

Sources: 190:18-19--this data not in parentheses
186:241-44--this data in parentheses
Figure 2. Model of the Office of Technical Direction of Industrial Unit
Figure 3. Model of Relationship between Technical Direction of Unit and Consuming Industry
President and Secretary of Agriculture that control the granting, suspension and cancellation of exploitation permits.

**Rational Development of Forest Lands**

By bringing small properties together under one exploitation unit, they are placed under a single forest management system. Since property will be contiguous with at least one other property, they will tend to contain similar physical characteristics which will be advantageous to a single set of silvicultural practices. Huguet (117) notes that the combining of many small properties (in some cases, a unit will consist of more than a thousand individual properties) and placing the resource under government control disregard the concept of property rights, and subordinates them to the general welfare of the people—a concept set forth in Article 27 of the Constitution. Nevertheless, private ownership is retained (117:51), except in the cases of ejidos and communes. It is interesting to note that in many respects, the Units are the direct result of Mexico's Agrarian Reform, which itself grew out of the Revolution of 1910—a revolution which sought a more equitable distribution of property.

Placing many small properties under a single exploitation system is an aid in maximizing industrialization of forest products. In the past, there was a tendency for forest industries to utilize only those raw materials which reaped the highest profits, while other
materials were wasted. Since the creation of a forest unit requires a complete study approved by the federal authorities, all types of industries are considered. For example, if lumber is the prime product from a given unit, it is estimated that there will be wastes equivalent to approximately 65% of the total forest product (193:1). Therefore, the study must consider other types of industrialization as well, which might include installations for processing fiber or particleboard or even the possibility of a pulp and paper mill, which is probably the most efficient user of forest products. However, since only a limited number of paper mills are needed and since they do not require larger stems, it is rational to attempt to fully integrate forest industrialization.

Equitable Distribution of Forest Wealth

The establishment of an Industrial Unit considers the landholder's interest in forest conservation and utilization. The Forest Law of 1926 proposed that the owner or landholder should be the exploiter; however, it was the concept of the Units as clarified by the Law of 1942 which provided a vehicle to give him the technical direction and financial assistance necessary to do so and, thereby, develop a deep concern for the propagation of the forest. In 1962, Ruiz Morales suggested that one of the problems in forest matters was the low cultural level of the campesino and that without government
intervention, he was at the mercy of commercial enterprises, whose interest in forest conservation and propagation was marginal. By providing technical direction and financial assistance, the government has given the campesino assistance in raising his cultural level and diminishing the destructive force of the commercial enterprises (191:3). If necessary credit can not be obtained from official sources and the law allows ejidal and communal landholders to associate with private owners. Presumably, this would make credit more available since ejidal and communal lands cannot be sold or mortgaged for credit purposes.

Furthermore, by creating units to provide a sustained supply of raw material for large industries, the obtaining of huge capital investments has been facilitated. Huguet suggested that 6 million dollars (U.S.) was necessary to build a paper mill in 1953 and that without a guaranteed source of material, investors were most reluctant to commit excess funds to the construction of the plant (117:53). As an adjunct to this, if the proprietors of small properties desired to form a unit and establish their own industry, it is obvious that credit would be a necessity. A few individuals would be unable to obtain funds sufficient to construct even a small sawmill, yet by means of units combining large areas comprising many properties, the obtaining of credit has been rendered much less difficult.
Sustained Supply of Raw Materials for Industry

With the growth of wood industries, especially pulp and paper, it became imperative that a sustained supply of raw material be readily available. During the earlier part of this century, some industries maintained rather extensive areas of forests as their own private property. Redistribution of property, however, has not allowed this custom to endure and, based upon the organization of Industrial Units, it is not necessary. It would seem that greater cooperation between industry and the public is fostered by the expropriation of large tracts of forest land and their subsequent redistribution of the campesinos as forest ejidos in that it fulfills the requirements of the Constitution and gives land to the landless, while at the same time continuing intact exploitation unit under strict government control.

Forest Management Units

Primarily because little has been written about them, it appears that the Forest Management Units are of much less importance in Mexican forestry than are the Industrial Units. The lack of material may well be due to the relative newness of Management Units. They were first mentioned in the Bylaws of 1950 (see Chapter IV, p. 103-104), but none were created until after 1960.
Purpose of Management Units

The Management Units do not have the purpose of the Industrial Units, yet one should not underestimate their value. Their stated purpose is to associate the diverse proprietors forming the Unit and enclose them in the same Plan of Exploitation or Management Project to obtain a better forest yield. As previously noted, this means the landholders are free to contract the sale of their forest products with any industry or company they choose. Probably the most important of the requirements of the Management Unit is that it embraces a single method of forest treatment. Moreover, government control is maintained over these lands—indirectly through the granting of authorization for exploitation, and directly through the Technical Forest Director, who is subject to the dictates of the Law and the dispositions of the Forest Authorities.

Criticism of Management Units

There appears to be some criticism of the Management Units in respect to the sale of the products. One writer suggested in 1961, that up to that time, no Management Unit had been formed in which the proprietors could dispose of their products "... in a form that accommodates their interests without more obligation than contributing to the costs of the administration of the Unit..." (12:11-12).
Administration costs include those of surveillance, technical services, conservation, protection and reforestation. He further seems to feel that the Industrial Units are an infringement upon property rights, profit and free enterprise--that they were created not to serve the forest owners, but rather, companies such as the railroads and paper industries who cannot pay the high prices for raw material paid by the sawmills or producers of large beams or of laminated wood products. This, he contends, is an unlawful act and an injustice in a law-abiding country. The Management Unit, however, does not create this problem if the costs of administration are not charged to the proprietors of the forests.

The decree that created the Forest Management Unit of the Region of Orizaba was so limited in scope that it did not delimit the zone, it did not indicate the properties to be included or the rights and obligations of the proprietors, nor did it allow them to name a representative to the Committee for Forest Promotion nor the Technical and Investment of Common Funds Committee. Furthermore, it did not even "...allude to the method of forest treatment, the maximum intensity of cutting to be authorized, nor the quotas the proprietors were expected to meet..." (12:12-13). These are all considered basic details to be contained in the decree.
Effectiveness of Management Units

As was previously mentioned, little research has been conducted relative to the Management Units, and since the objective of these Units is only to increase the forest yield, it is too early to fully evaluate their impact. Nevertheless, it would appear to be a reasonable assumption that since they are directed by a professional forester, some gains are being accomplished. The latter statement is made in the light of discussions with directors of Industrial Units, who are also in charge of Management Units within those Industrial Units.

Private Exploitation Companies

Private forest companies are quite a different matter from the Units. In spite of legal requirements, at the present time they constitute the core of the forest problem (38:292), and are by far in the majority in terms of the number of concessions granted. Although they are not of any great economic significance, private companies are a problem in terms of improved forest utilization in that they generally are not able to utilize the high percentage of the tree as is true in the case of the large Units. This is due, primarily, to the large investment required to construct the facilities to utilize the total tree. It is only the large forest Units supplying fully integrated industries that maintain a high utilization rate.
While the larger of the private companies seem to be responsible in promoting good forest management, many of the smaller companies apparently have failed in what should be their basic objectives: 1) the constituting of a permanent operation--this failure is indicated by the large number of cancellations, and 2) the establishment of an attractive profit margin. According to the Cámara Nacional de las Industrias Derivadas de la Silvicultura, they have failed also to establish harmonious relations among the diverse sectors of the industry and as a result, each sector remains very much isolated, each looking only to its own particular interests. They also tend to operate under somewhat backward conditions or with older techniques, due in a large part to the lack of sufficient capital to modernize and as a consequence, sustain large coefficients of waste.

Insecurity of Concessions

As was mentioned earlier, one of the problems with which the private companies must contend and which creates further problems for the forests as well, is the insecurity of the existing concessions. The private company attempts to remove as much material from the forest as possible in a very short time, but because of the small area concessioned to it, it is restricted in the total volume possible. As a
result, little is invested in production methods and access roads and an adequate silvicultural treatment. The short term-high profit-low investment characteristics of these companies makes them very mobile and adds little to the establishment of an integrated industry or the attainment of a strong market (38:292-96).

Recent Developments in Government Control of Forest Exploitation

Probably the most far-reaching of the recent developments in Mexican forest activity is the creation of the Decentralized Public Organizations, both on the state and federal level. 15

Decentralized Public Organizations

It is difficult to definitively indicate how these organizations differ from those of the Units which were discussed earlier, except to state that they are not associated with private industry and that they are new in the sense of being organized with an almost totally new infrastructure. For example, many new plants are to be constructed

15 If the use of the term 'decentralized' and its reference to state and federal levels seems to be conflicting, the writer can only agree. The Spanish word 'decentralizado' appears to be translated in only two ways--decentralized and autonomous--terms which are completely unsuitable, especially when it is realized that these organizations are manipulated by government officials and to a large extent are funded by government banks and trusts.
as opposed to utilizing only existing structures. Also, they tend to encompass larger areas of land and to be more fully integrated.

The first of these organizations, Mexican Forest Products (Productos Forestales Mexicanos or ProForMex), was created by Presidential Decree on August 28, 1967 to operate in the state of Durango. "Mexican Forest Products was created with the object of incorporating into the economy a vast forest area in the state of Durango which has been under a decree of prohibition" (38:289). The decree of prohibition was promulgated November 26, 1949. Since 1967, two more of these decentralized organizations have been decreed. One, Protectora e Industrializadora de Bosques (Protinbos), is a state organization and was created on December 30, 1969 in the state of Mexico. The other, the Decentralized Public Forestry Organization Vicente Guerrero, is a national organization and was established by decree on August 2, 1972 in the state of Guerrero.

Each of these organizations is administered by a council. The national organizations' councils consist primarily of the executive branches of the government (Secretary of Agriculture, Department of Agrarian Affairs and Colonization, Secretary of the Interior, National Banking Trust, etc.) and some local representation. The state organization has a council of representatives from the executive branches of the Federal Government, but is presided over by the state Governor with more local representation.
The National Forest Development Program was initiated January, 1972, when the studies necessary for its elaboration were implemented (170:778). This program includes 18 regional projects in 17 states and among them are the Decentralized Public Forestry Organizations plus some others which have not as yet been established. These projects are: Tarahumara in Chihuahua; ProForMex in Durango; Vicente Guerrero in Guerrero; Michoacán in the central zone of Michoacán; Atenquique in Jalisco; Centro de Durango in Durango; Huicot in Nayarit, Jalisco, Zacatacas and Durango; Protinbos in México; Sureste in Tabasco, Campeche, Yucatán and Quintana Roo; Chiapas in Alto Chiapas; Lacandon in the Lacandon selva of Chiapas; Istmo in the Isthmus of Tehuantepec in Oaxaca; Tuxtepec in Oaxaca, Ensenada in Baja California; and projects in Sonora, Sinaloa, the States of the Center and the States of the Northeast.

Objectives of the National Forest Development Program

The objectives of the National Forest Development Program are:

1) to conserve and improve the forest;

2) to generate permanent employment in the rural areas and to reduce inequality (presumably this is income);

3) to promote the creation of a sound, stable and permanent forest industry; and
4) to reduce imports and generate exports (170:779). It is far too soon to attempt an evaluation of these efforts to further the cause of forestry and forest industries, although they would appear to this writer to be steps in the right direction. Certainly, there should be a broader distribution of financial resources, since it is planned to invest 5.9 billion pesos (472 million dollars U.S.) in no more than six years. On the other hand, there are some distinct problems to overcome. For example, ProFor Mex which was created in 1967, had not begun operations as late as the Spring of 1972.

Other Recent Developments

Another development in the field of forest industries in Mexico occurred in 1972. On March 18, President Echevarría signed a decree creating an Industrial Forest Exploitation Unit in favor of Productora Forestal de Acuiluzio y Villa Madero in the state of Michoacán (146:31). This Unit includes ejidal, communal and private property in the amount of 78,833 hectares of forest, of which 57,235 hectares are considered exploitable.

Effects of Laws and Policy on Forest Resource Quality

Selection Method Fosters Management for Forest Improvement

The selection method of harvesting is commonly used in Mexico
through marking trees to be felled and should favor improvement of the forest resource. The selection method has been analyzed by the Cámaran Nacional de las Industrias Derivadas de la Silvicultura with the following conclusions (38:299-306):

1. Costs of extraction are high because of the small volume per unit area and the necessity of constructing a dense network of roads.

2. While it does present a degree of soil protection and less danger of invading species of herbs and grasses, it is difficult for light to penetrate to the young trees. This is particularly necessary for pines.

3. It allows little variation in the density of the remaining trees and hence, presents protection against wind and other atmospheric agents.

4. The age mix of remaining trees should reduce danger of insects and diseases and presents a relatively stable equilibrium; however, the tendency of the industries to want to maximize profits and the minimum diameter of cutting lessens the effectivity of the age mix.

5. From an esthetic point of view and in the face of public opinion, the selection method is best since it leaves no huge deforested areas.

6. The selection method of extraction endangers the standing trees, especially the younger trees needed for reforestation.

7. As indicated in number 4 above, there is a tendency to select the trees with the best characteristics—those which ideally would be the parent trees if left standing.

8. Selection by groups is more favorable to regeneration, especially with pines.

9. The selection method tends to eliminate the more favorable species and encourage the invading species.

Hence, it would seem that while the selection method is generally
desirable, it must be utilized properly and avoid pressures to cut only the best and largest trees.

Prohibitions of Forest Resource Development a Failure

In 1961, when the National Forest Inventory of Mexico was first begun, it was openly admitted that restrictions, sanctions and prohibitions were equivalent to a lack of management and fosters clandestine harvest. Also, it had become evident the forests needed silvicultural management to save them from the dangers of shifting agriculture, nomadic herding, fires, pests, diseases and clandestine harvesting (38:8-9).

Introduction of Cutting Prohibitions

The use of prohibitions is closely linked to the ideas of de Quevedo and his followers who developed the 'Cult of the Tree.' The legislation which first introduced this concept into the law (1926) was the result of de Quevedo's focus on the forest problem. The use of the prohibition has been continued even in the 1960 Forest Law; however, many have been lifted and others are now being carefully studied. Moreover, no new prohibitions have been decreed (38:7).

Justification for Cutting Prohibitions

The unfortunate results of the prohibitions are not to suggest
that they were of no value. On the contrary, when they are used under the right conditions and with the proper scientific management, they may serve a very real purpose. For example, an area considered to be forest land but on which all or nearly all forest vegetation has been destroyed, might properly be placed in prohibition, if reforestation was being attempted. The area, however, would need to be treated scientifically and would require some form of surveillance to avoid being again destroyed by individuals desiring the land for other purposes. Unfortunately, prohibitions were generally decreed to prevent exploitation and not for purposes of reforestation. Even if reforestation was the justification, there was not sufficient personnel to oversee the area.

Beltrán indicates a further justification which was used, though not overtly. He states that when degradation of the forest reached sufficient magnitude, public opinion frequently insinuated the State was involved. At this time, the State would decide the only solution was the imposition of prohibition which often covered the entire state. While the public applauded the action, destruction continued. The campesino either cut trees clandestinely, or, if he could not find a market, he cut the forest and planted corn or beans (17:121).

Results of Cutting Prohibitions

That the use of prohibitions generally has been a failure seems
clear, as has been affirmed by several writers in the field of forestry (see 17:39-40 and 121-22; 24:113; 23:217; 27:22; 65:319; 135:13; 197:21; 152:10; 15:42). Among the results of the prohibitions is the almost complete failure to accomplish their objective. This has been due primarily to two factors: 1) When the lands were withdrawn from legal exploitation, the residents of the area who had been dependent upon the forest for their livelihood were obliged to continue exploitation; however, it became clandestine in nature. Much of their activity was overlooked by the local officials. Furthermore, since it was clandestine activity, there was no incentive to take care of the forest. 2) The lack of development of the forest as a result of the prohibitions held back the economy of many areas and the establishment of viable industries which would have served to raise the level of living for many residents.

Thus, cutting prohibitions resulted in severe losses of forests and forest products. Furthermore, in many of the areas prohibited to exploitation or development, the forest industries furnished a major source of income to the campesinos—all of which was lost, creating a major socio-economic problem. The following table is submitted to give a greater appreciation for the magnitude of these prohibitions (38:111).
Table 2. Total prohibitions.

<table>
<thead>
<tr>
<th>State</th>
<th>Total affected</th>
<th>Forest affected</th>
<th>Temperate and cold forest zone</th>
<th>Other forest zones</th>
<th>Date decree promulgated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aguascalientes</td>
<td>558,900</td>
<td>308,800</td>
<td>29,180</td>
<td>279,620</td>
<td>24 /VI/40</td>
</tr>
<tr>
<td>Colima</td>
<td>545,500</td>
<td>291,777</td>
<td>30,393</td>
<td>261,384</td>
<td>20 /VIII/51</td>
</tr>
<tr>
<td>Distrito Federal</td>
<td>149,900</td>
<td>35,000</td>
<td>35,000</td>
<td></td>
<td>12 /III/47</td>
</tr>
<tr>
<td>Guanajuato</td>
<td>3,058,900</td>
<td>632,186</td>
<td>607,871</td>
<td>24,315</td>
<td>13 /VI/51</td>
</tr>
<tr>
<td>Jalisco</td>
<td>8,013,700</td>
<td>893,570</td>
<td>431,588</td>
<td>461,982</td>
<td>4 /V/49</td>
</tr>
<tr>
<td>México</td>
<td>2,146,100</td>
<td>699,052</td>
<td>699,052</td>
<td></td>
<td>12 /III/47</td>
</tr>
<tr>
<td>Michoacán</td>
<td>5,986,400</td>
<td>1,677,724</td>
<td>887,492</td>
<td>790,232</td>
<td>2 /VIII/50</td>
</tr>
<tr>
<td>Morelos</td>
<td>494,100</td>
<td>97,259</td>
<td>60,787</td>
<td>36,472</td>
<td>4 /V/49</td>
</tr>
<tr>
<td>Puebla</td>
<td>3,391,900</td>
<td>1,112,404</td>
<td>334,329</td>
<td>778,075</td>
<td>13 /VIII/47</td>
</tr>
<tr>
<td>Querétaro</td>
<td>1,176,900</td>
<td>778,074</td>
<td>395,116</td>
<td>382,958</td>
<td>20 /VII/50</td>
</tr>
<tr>
<td>Veracruz</td>
<td>7,281,500</td>
<td>2,346,381</td>
<td>279,620</td>
<td>2,066,761</td>
<td>19 /XI/52</td>
</tr>
<tr>
<td>Total</td>
<td>7,281,500</td>
<td>2,346,381</td>
<td>279,620</td>
<td>2,066,761</td>
<td>19 /XI/52</td>
</tr>
</tbody>
</table>

Agricultural activities have been repeatedly mentioned as one of the major contributors to the overwhelming devastation of Mexico's forests. Beltrán lists them as the number one cause of forest destruction (17:35-36), even though forest soils often will not support agricultural crops. Moreover, cattle, and livestock in general, compete with forests—and win. These facts have been recognized for decades, but still the campesino cuts the forest to plant his corn, beans and other staple crops only to find that in a few years the soil has lost its fertility and eroded, at times leaving a barren landscape awash with huge gaping scars that defy man's ingenuity to heal. He allows his livestock to pasture on forested land and in so doing, destroys seedling trees that might one day have both protected the soil from erosion and provided him with firewood and construction materials or an income from the sale of their products sufficient to provide for some of his necessities. Not only does the denuded landscape fail to support his crops, but its topsoil pollutes the streams and fills the reservoirs that once held precious irrigation water in a land where rainfall is highly undependable.

A principal contributor to the agricultural takeover of forest lands has been the forest exploitation permit holder who has not reforested the land once exploitation has been halted, in spite of a forest law
which indicates his responsibility to do so. This has left a barren land, which in some cases might have naturally regenerated its forests, but since little or no effort was made to keep the campesino out, he moved in to plant crops and pasture his livestock. Even the most recent Forest Law provides for deforestation for agricultural purposes (Articles 44 and 45 of the Law and 123, 126, 127, and 131 of the Bylaws). Included in these same sections of the Law are articles dealing with the obtaining of permission for pasturing livestock in forested areas.

Arias P. stated that in the 1950's two-thirds of Mexico's population lives in rural areas and produces only one-fifth of the national income (9:16). Their agricultural activities demonstrate a marked backwardness and in the final analysis, their precarious economic condition forces them to deforest land (or refuse to reforest it) to raise their staple crops regardless of the end result, which according to the penalties set forth, could be rather defeating for them.

In the more humid tropical areas of Mexico, slash and burn agriculture annually destroys hundreds of hectares of forests. Arturo Gómez Pompa, head of the Botanical Institute of Biology at the Universidad Nacional Autónoma de México contends that much of this is the result of Mexico's policy of colonization (11:9). Under this policy, deforestation is practiced to make more land available to the campesinos. Inadequate finances and education of the colonizers
prompts them to continue a system of extensive farming where a scientifically based method of intensive farming would be far less destructive of the forests (40:12). Hence, it can be recognized that in spite of a law which was supposedly conservative of the forests, conflicts existed with which the Forest Law was unable to contend.
CHAPTER VI

OBSERVATIONS OF SELECTED FOREST UNITS

As was noted in the previous chapter, forest development in Mexico is now regulated by law to the extent that forest resource practices are largely controlled by the Federal Government, although primary material utilization is by private industry, and the industry finances forest management and harvest under permits and concessions. In order to more fully understand the influences of laws and policy, the forest practices of six industrial forest units were analyzed. The units were selected to provide a cross-section of climatic and topographic conditions, forest types, and of associated industrial utilization.

The Units analyzed are:

1. The Industrial Forest Exploitation Unit of Las Fábricas de Papel de San Rafael y Anexas, S. A., in the States of México, Puebla and Morelos.

2. The Industrial Forest Exploitation Unit of Maderas Industrializadas de Quintana Roo, S. de R. L., in the Territory of Quintana Roo.

3. The Industrial Forest Exploitation Unit of Compañía Forestal de Oaxaca, S. de R. L., in the state of Oaxaca.
PRINCIPAL COMMERCIAL FOREST TYPES OF MEXICO

TEMPERATE FOREST -- MAINLY PINE AND OAK

TROPICAL HARDWOOD FOREST

MAP 1
4. The Industrial Forest Exploitation Unit of Michoacana de Occidente, S. de R. L., in the state of Michoacán.

5. The Industrial Forest Exploitation Unit of Tripay y Maderas de Durango, S. de R. L., in the state of Durango.


Unidad Industrial de Explotación Forestal de las Fábricas de Papel de San Rafael y Anexas, S. A.¹⁶

The San Rafael Unit is under concession to one of the largest pulp and paper manufacturers in Mexico with a pulp and paper mill at San Rafael, a company town in the state of Mexico. The forests of the Unit, however, are found in adjoining areas of the three states of México, Puebla and Morelos.

Concession Area

The area comprising the concession is a belt of land almost completely surrounding the National Parks of Ixtaccíhuatl-Popocatepetl and Zoquiapan y Anexos, with the greater portion of the Unit being in the state of México (see Map 2). These National Parks are not included

¹⁶ Unless otherwise stated, factual data are taken from the Forest Development Study (Estudio Dasonómico), the documented forest plan required to secure and maintain the concession.
MAP 2

UNIDAD INDUSTRIAL DE EXPLOTACION FORESTAL
LAS FABRICAS DE PAPEL DE SAN RAFAEL Y ANEXAS

CIUDAD DE MEXICO
NATIONAL PARKS
SAN RAFAEL
MECAMECA
IXTACIHuatl
POPOCATEPETL
MEXICO
MORELOS
PUEBLA

ROADS
UNIT BOUNDARY
POPULATION CENTER •

0 10 20 km
in the Unit, since they constitute a Prohibited Zone. Significantly, when the Unit was established provisionally in 1944, the National Park area was larger than it presently is. It was determined that the original area of the Unit was insufficient to supply the raw materials needed by the mill. Hence, when the Presidential Decree creating the Unit on a permanent basis was promulgated in 1947, the lower limits of the Park area were raised from 3,000 to 3,600 meters. This action enlarged the Unit by approximately 26,000 hectares. It is interesting to note that this enlargement still was not sufficient to supply the mill with raw material as both cellulose and wood is imported from other states in Mexico.

The paper mill at San Rafael was constructed in the late 1800's near the base of Ixtaccihuatl about halfway between the northern and southern limits of the Unit. As a result of this location and the paucity of even secondary access roads, the primary forest materials for the paper mill must be transported considerable distances. While the Unit is not particularly large, it does cover an area approximately 85 kilometers in length by 65 kilometers in width.\(^\text{17}\)

The total area included within the Unit is 84,195 hectares of which 64,310 hectares are considered to be forested; however, only 43,980 hectares are classed as exploitable quality. The total

\(^{17}\) It should be remembered that the National Parks are included in these dimensions and contain an area of 25,679 hectares.
exploitable area of pine is 31,880 hectares or 72.5% of the exploitable area, while for fir the figures are 11,725 hectares or 26.6% of the exploitable area. The remainder of the exploitable area (0.9%) is of white cedar (Cupressus benthamii) and some oak, but neither is of great significance.

Harvesting of pine resin (resina de pino) is carried on, but only 15 separate properties are involved. Provisions are made for the processing of 1,372,233 kilograms of pine resin yearly from 7,768 hectares of forest. (It is interesting to note that the only trees to be affected by the development are trees that previously have been marked for harvesting. This is probably because of the damage to trees in the process of collecting the resin.)

Property Ownership

There are 124 separate properties contained within the San Rafael Unit. Of these, the Forest Development Study indicates 84 are communal and ejidal, 39 are private and one is National Property. Table 3 (p. 148) is indicative of the manner in which the forest units combine many ownerships for forest management and harvest. The table further indicates the variations in sizes of properties, some of which are quite small while others are quite large. This, of course, creates one of the problems in management which the Forest Units have adequately dealt with for the most part. While these various
Table 3. Number of properties by size class and tenure system, San Rafael Unit.

<table>
<thead>
<tr>
<th>Size classes (hectares)</th>
<th>No. of properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communal or ejidal</strong></td>
<td></td>
</tr>
<tr>
<td>64- 600</td>
<td>35</td>
</tr>
<tr>
<td>601-1200</td>
<td>20</td>
</tr>
<tr>
<td>1201-1550</td>
<td>9</td>
</tr>
<tr>
<td>1551-9459</td>
<td>15</td>
</tr>
<tr>
<td><strong>Private</strong></td>
<td></td>
</tr>
<tr>
<td>42- 650</td>
<td>34</td>
</tr>
<tr>
<td>651-1200</td>
<td>5</td>
</tr>
<tr>
<td>1201-3237</td>
<td>1</td>
</tr>
<tr>
<td><strong>National</strong></td>
<td></td>
</tr>
<tr>
<td>1580</td>
<td>1</td>
</tr>
<tr>
<td>7371</td>
<td>1</td>
</tr>
</tbody>
</table>

The data were missing for one ejido, while in two cases, two ejidos had been combined. The smaller of the National Properties in the table is an experiment station for the Instituto Nacional de Investigaciones Forestales. This property is not included in the previous breakdown of property ownerships.

Properties are considered to be forest lands, many of them are primarily used for agriculture; however, since erosion has so very nearly depleted the soils, attempts are being made to again create forest on them. These attempts seem to be successful, but at the present rate of reforestation of deforested lands, many decades will pass before it is completed.

The Forest

The forests of the San Rafael Unit consist of a large number of
species of trees. There are tendencies for certain species to occur in certain places because of variations in climate, elevations, slope facing and exposure to sunlight; however, there are few pure stands. The most important species are the conifers, especially pines and fir, as previously indicated. The forests are reasonably clean and free from slash and underbrush. This is probably because the campesinos use slash for domestic fuel purposes and not because of complete integration of forest products industries as called for by the law. Nevertheless, it may be assumed that because pulp and paper is the local industry, there is much less slash than might otherwise be left in the forest.

Species

The major species of trees exploited are the pines (Pinus) and fir (Abies) as follows:

- *Pinus montezumae*, forma *macrocarpa*
- *Pinus hartwegii*, and *Pinus rudis*
- *Pinus michoacana-cornuta*
- *Pinus pseudostrobus* Lindl.
- *Pinus pseudostrobus-F. protuberans*
- *Pinus pseudostrobus apulcensis*
- *Pinus pseudostrobus oaxacana*
- *Pinus ayacahuite VEITCHIL*
- *Pinus leiophylla* Scl.
- *Pinus teocote* Scl.
- *Pinus lawsoni*
Abies religiosa

Interspersed with the many species of pine, the fir, white cedar and oak is another broadleaf species of some importance, the aile (Alnus acuminata). The importance of the aile is as an invading species which appears only when other species are removed by exploitation, disease and insects, fire, etc. The only development of aile is for charcoal (carbón) and requires no specific permit for removal.

Management Practices

As required by the Forest Development Study, the harvesting system employed is the selection method modified by the Cycle of Harvesting. The approved cycle of harvesting is applied to the Unit at San Rafael as follows:

a) The Unit is divided into three zones according to the growth characteristics of the forest.

b) Each zone is designated as having a specific cutting rotation:
   Zone I -- 19 year cycle
   Zone II -- 17 year cycle
   Zone III -- 20 year cycle

c) The various properties within each zone are subdivided into cutting areas whose number is determined by the number of years in the cycle, and whose areal extent is determined by the production capacity of the subdivision in an effort to produce approximately the same income each year by cutting the same amount of timber each year. The purpose of this is to guarantee the property holders an annual income.
In general, the same system is utilized throughout Mexico, although there are exceptions, as will be noted in the case of the Unit in Quintana Roo. The selection of the trees to be marked (for a discussion of the marking procedure, see Chapter IV, p. 105) and cut is based on the Intensity of Harvesting, which is 40% (on the average) by volume of standing timber. Presumably, Intensity of Harvesting applies only to the coniferous species being developed,¹⁸ since all aile (Alnus acuminata) is cut by the sawyers for firewood as the pine and fir are cut for pulp.

**Harvesting Operations**

The harvesting operations are mainly accomplished by hand saws and axes as the workers use very few power tools. The use of hand tools seems to be of their own volition— they fear mechanization since it will decrease the amount of work available to them. The trees are first marked as required by law and then felled. Following the felling, the trunks and larger limbs are cut into either 2 or 4 foot lengths. Using axes, they are then debarked and split into predetermined sizes depending upon the capacity of the chipping mill. The cut and split logs are then piled in cords so that the forest service personnel

¹⁸ Oak (Quercus) is also being developed, but its importance is very marginal due to previous exploitation of oak to make charcoal. This nearly depleted the supply.
may record the amount of material removed from the forest. Transportation of this material from the forest to the mill is then accomplished by the workers using farm trucks which belong to the ejidos or private property owners.

Except for the excessive use of axes, it appears that the Laws and Bylaws are carefully observed in the field, especially by the Forest Service personnel. Clandestine operations are kept to a bare minimum and, in fact, the technical personnel of the Unit repeatedly indicated that clandestine activity presented no problem for them.

Reforestation and Soil Recuperation

A substantial amount of work is being accomplished on the Unit in terms of reforestation and soil recuperation. Some of the area consists almost entirely of bare ground which gives the appearance of bedrock and is referred to as tepetate. However, with the aid of a large track-type tractor, the ground is being scarified and terraced. This is to loosen the ground for three purposes: 1) so that it might better absorb moisture; 2) to reduce and slow down runoff; and 3) to make furrows for the planting of seedling trees. It is interesting that some of the seedling trees which had been planted (mostly pines) were surviving very well, while others, primarily cedars, were sustaining heavy losses. Among the pines which were planted were the P. montezumae, P. patula, and P. radiata. It appears that the P. patula
is the least adapted to the area and while the *P. montezumae* is the only one of the three that is native to the area, it does not seem to grow as well as the *P. radiata*. In places, two-year-old *P. radiata* has attained heights of 20 feet or more and has trunk diameters of 4 to 6 inches. Two-year-old *P. montezumae* rarely reach heights greater than 2 to 3 feet.

For the most part, however, reforestation consists of natural regeneration with supplemental artificial regeneration depending upon the availability of adequate parent trees and seeds. In any event, it appears that compliance with the law in the matter of reforestation is considered by the Unit Director to be of utmost importance.

**Social Services**

The Forest Laws of the Twentieth Century have emphasized concern with social and economic conditions in forested areas. Among the social factors are those of education, health facilities and income. Each of the recent laws has emphasized the necessity of industry assuming the responsibility of providing for schools, and health facilities, especially for the more isolated forest areas. San Rafael, as a company town, contains these facilities.

Field observation of the Unit in operation confirms that the forest laws are observed carefully and that efforts toward control of illegal activity are successful at least in this unit.
The Industrial Forest Exploitation Unit of MIQRO is located in the Territory of Quintana Roo with its local headquarters in Subteniente López, a small village about 12 kilometers from Chetumal. The forest concession of MIQRO consists of two separate sections, one in the central and one in the southern portion of the Territory of Quintana Roo. MIQRO's concession was granted by Presidential Decree on July 30, 1954. Following the establishment of the Unit, a plant was constructed in Subteniente López on the banks of the Río Hondo at a total cost of over 18 million pesos ($1,440,000 U.S.). The plant produces plywood, veneer and lumber.

Concession Area

The total area included in the Unit is 551,365 hectares of which 334,298 hectares is national land and 217,166 hectares is ejidal land. In September, 1955, Hurricane Janet struck part of the Unit causing considerable destruction. In order to meet harvest commitments, the Unit was enlarged by some 88,000 hectares. The Unit is divided into a northern and a southern section, which are separated by a belt of

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19 Unless otherwise stated, factual and statistical data are taken from the MIQRO Forest Development Study.
land approximately 100 kilometers in width. This latter area suffered serious damage during the previously mentioned hurricane and contains little economic activity other than nomadic agriculture.

On the basis of topography and soil the Unit is divided as follows:

I. **Cuyerías**—hills or mounds no more than 50 meters above sea level, red cedar (*Cedrela mexicana*) is a principal species,

II. **Tsekelares**—slopes greater than those of the Cuyerías, few commercial species,

III. **Planadas** or Kankabales—minimum slopes, considered to be area of good soil, mahogany (*Swietenia macrophylla*) is a principal species,

IV. **Yaxhomailes**—variable slopes, localized in higher area and surrounding low-lying areas, mahogany is a principal species,

V. **Bajos, Lagunas** and **Pantano**—low-lying, marshy area, vegetation is 10 meters or less in height, periodically inundated,

VI. **Areas Agrícolas**—areas used for agricultural purposes,

VII. **Areas Perturbadas** (Quemadales)—areas being deforested for agriculture or disturbed by burning, often found with I, III and IV.

**Property Ownership**

At the time the Unit was created, there were only six ejidos involved; however, by 1968, three new, small ejidos had been established in the northern section of the Unit. Also, there are several
private properties located in the northern section, but they are not recognized by the Federal Government. Only three of them seem to present any serious threat to the government's claim to the land and the resources, and based on the Mexican interpretation of Article 27 of the Constitution, even these pose no threat. Nonetheless, the Technical Director of the Unit believes that the claim should be settled as soon as possible to avoid larger problems that might arise at a later date (one 'owner' has already filed a suit for compensation for hardwoods which were removed from his property). Each of the sections of the Unit contains three ejidos and large areas of national land.

The Forest

The forests of the MIQRO Unit are typical of the wet-dry tropical areas. Luxuriant tropical forests tending toward jungles are interspersed with areas of savanna grasslands. On the better drained soils, one finds fields of slash and burn agriculture, sometimes waiting to be burned for the first time, sometimes already having been burned and at others, in various stages of regrowth into forests.

Species

While there are over 100 species which may be harvested, only 15 are considered to be of major importance. Even so, the vast
majority of the timber being harvested is of two species; mahogany (Swietenia macrophylla) and red cedar (Cedrela mexicana). In 1969, the Municipio of Payo Obispo, which makes up most of the Unit, produced the following quantities (104:139-40):

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahogany</td>
<td>15,720,000 m³</td>
</tr>
<tr>
<td>Red cedar</td>
<td>3,662,000 m³</td>
</tr>
<tr>
<td>Other tropical species</td>
<td>1,651,000 m³</td>
</tr>
</tbody>
</table>

On the other hand, for the Territory of Quintana Roo as a whole, the following data were tabulated from the same source:

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahogany</td>
<td>19,339,000 m³</td>
</tr>
<tr>
<td>Red cedar</td>
<td>7,133,000 m³</td>
</tr>
<tr>
<td>Other tropical species</td>
<td>29,619,000 m³</td>
</tr>
</tbody>
</table>

The indication is that mahogany is more in demand as a veneer or lumber and that most likely, it is more available in the Municipio of Payo Obispo. In fact, the Technical Director of the Unit stated that mahogany was utilized 8 to 1 over red cedar in the plant at Subteniente López because of the demand.

Management Practices

The method of treatment of forest development at MIQRO is by selection; however, the tree species are selected on the basis of their commercial characteristics. While some clear-cutting is used, it is only for the purpose of clearing land for agriculture in accordance with the law; i.e., agriculture must be proven as being more economically beneficial than the maintaining of forest conditions.
In the development and management of the forest, the **Forest Development Study** notes certain objectives which must be kept in mind. They are: 1) extraction of industrial and commercial trees; 2) to assure the increase in volume and number of those trees; 3) to favor the conditions of development which will improve the quality of the products; 4) to eliminate undesirable species; and 5) to care that small trees are allowed to develop. This is accomplished in a number of ways. One is to adhere to the minimum diameter for felling which is 60 centimeters for mahogany and red cedar and 35 centimeters for other tropical species.

While 'intensity of felling' is important in coniferous forests, it cannot be maintained or established in tropical forests because of the large number of species and the dispersed growth pattern of any single species. Unfortunately, no 'cycle of felling' can be established as yet at the MIQRO Unit because of the lack of knowledge of growth characteristics of tropical species and the lack of uniformity in growth characteristics from one to another of the large number of species. Moreover, because of the lack of an adequate inventory and the heterogeneity of the forest species, a schedule of 'areas of felling' cannot be determined. As a result, the 'areas of felling' depend upon the judgment of the personnel in charge of felling; however, as the work proceeds, the forest is divided into quadrangles of one square kilometer for purposes of future development. Presumably, this will aid in establishing 'areas of felling.'
Harvest Operations

In carrying out the harvest operations, the trees to be felled must first be located and marked for felling and some form of road must be constructed. The construction of the road consists primarily of pushing the smaller trees aside with the use of a bulldozer, an operation that must be completed for virtually every tree that is felled. These smaller trees, mostly less than 6 to 8 inches in diameter, are used only as poles for huts, firewood, or other domestic uses. Approximately eight to ten merchantable trees are felled for every kilometer of road opened; consequently, the road is little more than a trail large enough for a bulldozer or a semi-trailer truck.

Once the road is opened, the trees are felled, cut into logs of about 30 feet in length and skidded to the yarding area where they are marked to indicate the number of the tree (they are numbered according to the order in which they were felled), the year in which they were felled, the property from which it came and its species. One quite interesting facet of the operation is the manner in which the trees are felled. Most of the felling is done with the use of a heavy machete. The use of the machete is probably because of the flange-like buttress of most tropical trees. Once the trees are felled, however, they are cut into logs using a chain saw.

The scaling of the logs takes place in the yarding area. They are then loaded onto large semi-trailer trucks and transported to the
Bacalar Lagoon some 70 to 75 kilometers to the east. Transportation is carried out by a separate company which contracts the job, in the present case the company is Servicio de Explotación Forestal, S. A. (SEFSA). Once the logs reach the lagoon, they are sorted according to species and towed by tug to a point near the plant at Subteniente López. It is approximately 140 kilometers from the plant to the cutting area in the northern section of the Unit. This means that transportation is a problem; however, since much of it is by water, it is less expensive than might be supposed.

Reforestation

A combination of methods is used in forest regeneration. In some cases, regeneration is natural, aided by some artificial reforestation. In other cases, it is by the use of the cepa or coppice method. Among the many problems encountered in reforestation in the forests of MIQRO is water supply. Due to the permeable nature of the limestone subsurface material, adequate water is not available for irrigation during the dry season. Hence, it is not feasible to establish nurseries in the forest. Furthermore, the mortality rate among the seedlings is rather high and it is often necessary to replant, thus decreasing the total area that might otherwise be reforested.
Social Services

The social conditions of MIQRO differ from those of San Rafael. Each section of the forest has a series of movable work camps, whose locations depend upon the area under exploitation. There are 30 camps in the northern section and 6 camps in the southern section, each of which is strategically located according to the availability of water and accessibility to roads. The conditions in these camps are at best primitive; however, they appear comparable to conditions in the ejidal villages. The men live in huts, normally built of poles and thatching, even though the company is obligated to furnish them with waterproof tarps to use as covering. Apparently, thatching allows better ventilation than do the tarps. MIQRO is also required to furnish services for its employees' families, such as schools, housing, potable water and a source of power if feasible.

It was perhaps less clear at this Unit that social regulations of the Laws were being closely observed; however, harvesting operations appeared to be meeting all requirements of the forest laws.

Unidad Industrial de Explotación Forestal de la Compañía Forestal de Oaxaca, S. de R. L.20

The local headquarters of the Unit are located in the city of

20 Unless otherwise stated, factual and statistical data are taken from the Forest Development Study for the Unit.
Oaxaca, state of Oaxaca. The forest of Compañía Forestal de Oaxaca is some 120 kilometers to the southwest of the city (see Map 4). The Unit presently furnishes raw materials for three organizations (industries), Compañía Forestal de Oaxaca, Triplay de México and Novopán de México.

Concession Area

The concession was granted to Compañía Forestal de Oaxaca by Presidential Decree on October 13, 1958; however, a portion of the area, the property named San Pedro El Alto, had been under exploitation since December, 1949. The original application was for two zones, made up of 24 separate properties and containing 163,784 hectares, to supply raw materials to Compañía Forestal de Oaxaca and Chapas y Triplay. The Preliminary Study submitted with the application was later revised to allow the creation of two other Units; hence, the delay in establishing the Unit under discussion. The total area of the Unit includes 63,596 hectares, of which only 39,339 hectares are exploitable forest, while another 16,918 hectares are approved for resin collection.

Property Ownership

The Presidential Decree approved 163,784 hectares consisting of 24 individual properties of which 61,347 were forested. The ownership
of the property was a combination of one ejido, two private properties and 21 communal properties and was divided into two separate zones. Immediately following the promulgation of the Decree, one zone came under litigation for the establishment of another unit, which was subsequently approved. This left the Unit with 13 properties containing a total of 72,232 hectares and consisting of 12 communal properties and one ejido. The one ejido was being exploited provisionally and as of 1960, was cancelled as part of the Unit. At the present time, the Unit consists of 12 separate properties—all communal—with a total area of 63,596 hectares as indicated earlier.

The Forest

The forest of the Oaxaca Unit contains a large number of vegetation species. The dominant tree species are conifers, specifically pines, as has been noted. The subdominant species are largely oaks, while the major invading species are primarily aile and madrono. For the most part, the forest can be considered mature, although there are some areas of second growth timber. In the more mature areas, the forest is ragged and stands in want of some cleaning-up. In other areas not satisfactory for cutting, resin is collected. In general, erosion appears to be moderate except where the forest has been clear-cut or destroyed by fire.
Species

The dominant trees being exploited are conifers of which there are 13 species—12 pines and 1 fir. These species are listed as follows in accord with the elevation at which they are found:

1. Pinus michoacana, Martínez—1800 to 2000 meters
2. P. pseudostrobus oaxacana, Martínez—1900 to 2550 meters
3. P. leiophylla, Schl. et Cham. --2000 to 2200 meters
4. P. lawsoni, Roezl--2150 to 2400 meters
5. P. pringlei, Shaw--2300 to 2550 meters
6. P. pseudostrobus, Lindl.--2450 to 2650 meters
7. P. douglasiana, Martínez--2250 to 2600 meters
8. P. teocote, Schl. et Cham. --2400 to 2550 meters
9. P. rudis, Endl. --2550 to 2650 meters
10. P. montezumae, Lamb--2600 to 2700 meters
11. P. ayachuite, Ehr. --2500 to 2850 meters
12. P. oocarpa ochoterenaí, Martínez--2500 to 2850 meters
13. Abies religiosa, Schl. et Cham--found with number 11 above

The major subdominant trees consist of five species of oak (Quercus) but are apparently not under exploitation. There are two invading species of note, the aile (Alnus jorullensis) and the madroño (Arbutus halapense).

Management Practices

Harvesting is accomplished by the selection method as is the case throughout most of Mexico. This is necessary since the development of the forest is primarily for pine and the forest is a mixture of several different types of trees. It is necessary to conserve a certain percentage of the pines for seed purposes to maintain pines as
the dominant species. Furthermore, the mix of different families of trees is desirable in order to maintain an ecological balance and to keep insects and diseases at a minimum.

Since a large portion of the forest of the Compañía Forestal de Oaxaca is considered to be 'virgin,' a minimum diameter for felling of 50 centimeters is maintained. This is particularly advantageous for two reasons: 1) lumber is one of the major products and requires larger trees, and 2) a second major product is plywood which requires peeler logs of large dimensions. Although there are three different qualities of trees being harvested, the same cutting cycle, 25 years, is maintained throughout the Unit. The intensity of cutting is variable, but averages 25%.

Harvesting Operations

It seems clear that the harvesting operations on this Unit, like the others observed, remains well within the limits of the law. The entire operation is mechanized, the felling is accomplished using chain saws, as is the bucking process, thereby minimizing wastes. The yarding is almost totally accomplished by mechanical means. Yarding is completed using either a movable winch (grúa) or a stationary winch (malacate) albeit in many cases, on a slope above a road, logs are yarded by hand. Logs are then loaded onto trucks and taken to the sawmill, the plywood and particleboard mill in Oaxaca or
some primary material may be taken to other industrial consumers such as the paper mill of Loreto y Peña Pobre in Mexico City.

The process of resin collection consists of the hanging of small collecting cups on the trees below a vertical gash which is cut in the bark of the tree. About once every three or four weeks, the resin cups are collected and emptied into 40-litre drums. Later, the drums are emptied into a large tank truck which hauls the resin to the distillery in Oaxaca where it is refined.

Reforestation

To aid proper reforestation, the Unit maintains forest nurseries in the forest. It would, of course, be most desirable if the foresters could rely on natural regeneration, but for reasons of fires or natural phenomena, they must be prepared for artificial reforestation. The major species planted in the nurseries, however, are pine and are used for reforestation and to enlarge the forest area. A third species, white cedar, is grown in the nurseries for ornamental uses, to form fences and as a new species to be used in construction because of its durability and to be grown because of its high resistance to insects and diseases.

Social Services

In accordance with the law on such matters, the Compañía
Forestal de Oaxaca appears to provide virtually all social services needed by the workers. At the Campamento Central, which is the location of the sawmill, the company provides homes for the workers and the administrative personnel. It also provides electricity, heating, primary school facilities, some recreation facilities, a company store and medical care. Medical facilities include not only a doctor and nurses, but also a clinic with facilities for minor operations, treatment of broken bones, cuts and some in-patient care.

The Industrial Forest Unit of Compañía Forestal de Oaxaca appeared to be operating well within the limits of the law and seemed to be successful in controlling clandestine activity.

Unidad Industrial de Explotación Forestal de Michoacana de Occidente, S. de R. L.21

The Michoacana de Occidente Unit serves to provide raw material for a large sawmilling industry and a resin distillery. The sawmilling industry is located in the forest, while the resin distillery is located in the city of Uruapan, Michoacán.

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21 Unless otherwise stated, factual and statistical data are taken from the summary of the Forest Development Study or the Presidential Decree which established the Unit (93:654-68).
Concession Area

The Forest Exploitation Unit for Michoacana de Occidente was established by Presidential Decree in December, 1954 and includes 306,242 hectares of land in the Municipios of Aguililla, Coalcomán, Tumbiscatio and Arteaga (see Map 5). Of this total land area, 165,084 hectares are forested; however, the Forest Development Study, dated 1959, included the study and planning of 260,432 hectares.

Property Ownership

The property ownership of this Unit is highly complex. According to the Summary of the Forest Development Study, there are 744 individual pieces of property which are divided as follows:

- Ejidos
- Communes
- Private holdings

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ejidos</td>
<td>1</td>
</tr>
<tr>
<td>Communes</td>
<td>1</td>
</tr>
<tr>
<td>Private holdings</td>
<td>742</td>
</tr>
</tbody>
</table>

Of these landholdings, only 65% are classed as being legitimate. Regardless of their legitimacy, the company must negotiate contracts with each of the 744 property holders (the figure would actually be higher than this, because the ejido and the commune might have several persons each that would be classed as owners; however, there would be a governing council or committee to do the negotiating).

The Forest

The forest of Michoacana de Occidente is dominantly a pine
forest with oak as the subdominant species. The forest seems to be well cared for and all exploitation is well within the limit of the law. While there is some clandestine activity, it is considered to be minor in scope, largely because of the distance to any local market. Apatzingán is the closest market and is at a distance of about three hours drive from the forest. The forest roads are in good repair, although during the wet season they are impassable.

Species

Among the many species under development are several pines and some oaks. The oaks are exploited on an irregular basis; however, due to the lack of a stable market. The major species being exploited are:

- Pinus leiophylla
- Pinus tenuifolia
- Pinus montezumae
- Pinus pringlei
- Pinus michoacana
- Pinus oocarpa
- Pinus douglasiana
- Pinus pseudostrobus
- Pinus lawsoni
- Pinus lumholtzii

Quercus spp.

Management Practices

Management practices include harvesting by the selection
method modified by the 'cycle of harvesting.' Of course, using this method all trees to be felled must be marked. There is, however, no fixed diameter for felling. It is felt that since there is no particular correlation between diameter of the stem and the age of the tree, a fixed diameter would hinder the improvement of the forest. The 'cycle of harvesting' is based on a 20-year rotation, regardless of the quality of the stand. The 'intensity of felling' in mixed stands for pine is 50% and for broadleaf (oak), is 5%. The average 'intensity of felling' for the Unit is 45%.

Harvesting Operations

The harvesting operations are thoroughly mechanized, albeit in some of the higher and steeper areas some oxen and horses are used in yarding. All felling and bucking is accomplished with chain saws. With the exception just noted, the yarding is achieved using either movable winches or stationary winches. Since the logs all are sent to a sawmill, they are hauled on semi-trailer trucks in lengths of approximately 10 meters. Hauling presents a problem according to the Unit officials. First, wet roads are impassable. This is due primarily to the nature of the soils and subsurface materials which form an extremely fine, powdery dust layer 2 to 4 or 5 inches deep when dry, and when wet form a very slick layer of mud. Second, while the drivers are considered to be adequately trained and capable
individuals, they are not reliable in terms of being on the job. Most of the officials seem to feel that the same is true for the majority of the workers on the Unit. Third, the distance from the cutting areas to the sawmills is so great (as is the distance from the sawmills to the nearest railhead, Uruapan) that the trucks can only make one trip per day. The Unit can only maintain about 25 trucks, most of which are used in hauling logs. Most of the lumber is moved by private transportation. The isolation of the main sawmill at Dos Aguas, where the machine shops are located, is sufficient to create major problems in acquiring repairs for trucks or any other heavy equipment. If parts are not too bulky and heavy, they can be flown in by single-engine aircraft as there is a small landing field nearby; however, for major repairs it may be several days before parts can be obtained.

Reforestation

Reforestation at the Michoacana de Occidente Unit is primarily for pines. Although oak is harvested, the demand is not large enough to warrant investment in reforestation, while other broadleaf species are not promoted at all. Based upon the use of the selective harvesting method and the fact that in marking the trees to be felled, there is a conscious effort to leave sufficient high quality seed trees standing in the forest, little expense and effort is made toward artificial reforestation. In other words, most reforestation is by natural regeneration.
Social Services

In accord with the law, the main encampment consists of workers' and administrative personnel's housing furnished by the company. The company also furnishes schools, playgrounds, electricity, a company store and complete medical facilities; i.e., two doctors, nurses, medical technicians, X-ray facilities, operating rooms, etc. There are other encampments which are not so well taken care of, apparently. During the time the writer was in the field in Michoacán, one ejido (Varaloso) went on strike and closed the road between the cutting area and the main encampment. While the officials were reluctant to detail the problem, it was understood that the ejidatarios were demanding that the company furnish them with free electricity, potable water, gas, playgrounds, and other facilities. Also, apparently many of the property owners were disgruntled with the prices they were receiving for the products. The official indication was that the property holders were being unrealistic in their feelings and that the company was not making enough profit to raise the prices for raw material.

Observations in the forests of this Unit, however, seemed to reveal an appropriate level of silvicultural management and that harvesting was being carried out with respect for the well-being of the forest.
The Industrial Forest Exploitation Unit of Triplay y Maderas de Durango is located in the municipio of San Dimas in the state of Durango, although its local headquarters are 210 kilometers to the southeast in the city of Durango. While distance does present something of a problem, the company has several light aircraft to aid in communications and moving of small items such as parts, etc. The principal industrial activities consist of a sawmill, a plywood mill, a box factory, and a fabrica de molduras y barrotes para caja alambrada, all of which are located in San Miguel de Cruces, a camp or village on the eastern edge of the Unit (see Map 6).

Concession Area

The concession area consists of two adjacent zones of the following sizes:

<table>
<thead>
<tr>
<th>Zone</th>
<th>Total area</th>
<th>Exploitable area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone I</td>
<td>26,615 hectares</td>
<td>24,277 hectares</td>
</tr>
<tr>
<td>Zone II</td>
<td>51,991 hectares</td>
<td>42,496 hectares</td>
</tr>
<tr>
<td>Unit</td>
<td>78,606 hectares</td>
<td>66,773 hectares</td>
</tr>
</tbody>
</table>

Unless otherwise stated, factual and statistical data are taken from the Forest Development Study.
This concession was granted by Presidential Decree on November 25, 1952.

**Property Ownership**

The property regime of the Unit is a mixture of private and ejidal, with 87 private properties and 7 ejidal properties. It is interesting to note that the private property holders are, in most cases, members of only a few families. For example, the two properties La Trinidad and Las Veredas are divided into 12 lots each. Each of the owners' surnames is Soto, suggesting that large landholdings have been subdivided and put in the name of various family members, probably to avoid expropriation by the Federal Government.

One ejido, the Ejido de Vencedores, while it is contained within the Unit, has the choice of selling or not selling its timber. That is, it is not a part of the Unit in the sense of joining with other properties and allowing the Forest Service to totally manage its forest resources.

**The Forest**

Since the principal industrial product has been the fabrication of plywood, there has been a tendency toward 'high-grading' the forest during operations. As a result, many older, low quality trees have been left in the forest to serve as seed trees. Consequently, the
forest condition has tended to be degraded. As has been indicated, the forest contains many species of trees, with pine as the dominant species and oak as the subdominant species. There are, however, several other species which, if given the opportunity, will invade or spread throughout the forest, further lowering its quality. In general, however, the forest appears to be relatively well-cared for and in good condition.

Species

Although there are a variety of different species of trees available on the Unit, only pine and oak are exploited. The major species of pine and oak are:

- *Pinus montezumae*
- *Pinus ayacahuite*
- *Pinus leiophylla*
- *Pinus teocote*
- *Pinus lutea*
- *Quercus endlichiana*
- *Quercus grisea*
- *Quercus salicifolia*

There are no invading species as such; however, if the exploitation of pine were very heavy, certain undesirable species would tend to increase. They are:

- *Aile*—*Alnus glabrata*
- *Madrono*—*Arctostaphylos* sp.
- *Tascate*—*Juniperus flaccida*
  - *Juniperus mexicana*
  - *Juniperus pachyphylla*
- White cedar—*Cupressus* sp.
Management Practices

The management practices of the Unit do not differ greatly from those previously discussed. The selection method of harvesting is maintained throughout the Unit. A minimum diameter for cutting is maintained at 35 centimeters, while it is recommended that all trees over 50 centimeters should be cut. The same minimum diameter applies to both the pine and the oak being exploited. A 'cycle of harvesting' is observed, which, in the case of both species being exploited, is an average of 24 years. The 'intensity of felling' averages 30%, although it is felt that in some cases it should be higher because little improvement of the forest growth has been noted since the beginning of exploitation. This is particularly true of trees whose diameters are greater than 35 centimeters. The following steps are recommended for forest improvement:

1. Cut all trees in decrepit condition.
2. Cut only those trees marked for felling.
3. Cut no higher than 30 centimeters above the ground.
4. Clean all slash from forest immediately following felling.
5. Care that no damage is done to seedlings.
6. Watch the direction of felling to avoid damage to other standing trees.
Harvesting Operations

The harvesting operations are almost totally mechanized throughout--from the felling of the tree with a chain saw to the loading of the logs on trucks with sophisticated heavy equipment. The stated management practices, as they apply to harvesting operations, appeared to be followed closely.

Reforestation

Reforestation in the forest of Triplay y Madera de Durango is primarily by natural regeneration. The Forest Development Study classified the land according to the following natural regenerative capacity:

<table>
<thead>
<tr>
<th>% of the area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null regenerative capacity 5.62</td>
</tr>
<tr>
<td>Scarce natural regeneration 32.48</td>
</tr>
<tr>
<td>Average natural regeneration 30.88</td>
</tr>
<tr>
<td>Good natural regeneration 21.40</td>
</tr>
<tr>
<td>Abundant natural regeneration 9.40</td>
</tr>
</tbody>
</table>

It was argued that artificial reforestation was unnecessary in this area; nevertheless, a small nursery was established for the eventuality that it might be required and for use in those areas where natural regeneration was insufficient. Furthermore, it was to comply with the requirements of the law.
Social Services

Triplay y Maderas de Durango employs as many as 1,200 workers, depending upon the season of the year and the conditions of the market. In so doing, it must furnish the living quarters for them in compliance with the law. It also furnishes schools, electricity, medical facilities, etc. for them, in accord with Article 10 of the Presidential Decree which established the Unit.

Although silvicultural and forest management practices may not be followed to the letter, it is probably adequate to promote forest growth in conformance with the dictates of the law.

Unidad Industrial de Explotación Forestal de Bosques de Chihuahua, S. de R. L.23

The Unit of Bosques de Chihuahua is located in the municipios of Madera and Casas Grandes in the state of Chihuahua. The city of Madera, located on the eastern side of the southern one-third of the Unit, is 325 kilometers by railway from the city of Chihuahua. Mesa del Huracán, the local headquarters of the Unit is another 55 kilometers (by air) north of Madera. While the distance from the city of Chihuahua to Mesa del Huracán by land is nearly 400 kilometers, it is only about an hour and a half by single-engine aircraft. These

23 Unless otherwise stated, factual and statistical data are taken from the Forest Development Study.
183

NUEVO CASAS GRANDES
MESA DEL HURACAN
ESTACION MADERA

UNIDAD INDUSTRIAL DE EXPLOTACION FORESTAL BOSQUES DE CHIHUAHUA

TO C.D. JUAREZ 203 km

ROADS
UNIT BOUNDARY
POPULATION CENTER

226 km
194 km

MAP 7

Source: (122:115; 126:Map No. 11)
flights are not scheduled on a regular basis, but do make the run about twice a week or as needed. Radio-telephone communications are maintained with the company offices in the city of Chihuahua for purposes of company business.

Concession Area

The area of concession to Bosques de Chihuahua originally contained 615,062 hectares in the state of Chihuahua of which, at the time of establishment in July, 1952, 239,276 hectares belonged to the company. The Forest Development Study, however, only included plans for 429,753 hectares. Of this area, 236,297 hectares were considered exploitable, while the remainder was shrubs and pasture land (181,128 hectares) or open and agricultural land (12,328 hectares).

Property Ownership

Historically speaking, the ownership of the property included in this Unit is quite revealing of property manipulations in Mexico, especially near the United States-Mexico border. In 1909, the Mexico Transportation Company, Ltd., a Canadian organization, obtained 1,323,100 hectares of land (this included 72,800 hectares in Sonora). In 1924, the Federal Government declared null and void an 1882 concession granted to the Comisiones Deslindadoras de Terrenos Nacionales upon which the Canadian company based its acquisitions.
A writ against the government allowed the company to keep its lands until 1938; however, the company desired to avoid new difficulties with the government and returned part of the lands in 1933 and at the same time obtained three titles from the Secretary of Agriculture for 615,062 hectares of land. When the Unit was created in 1952, the Decree indicated that only 245,122 hectares were appropriate for forest exploitation. The company, Bosques de Chihuahua, being interested only in the forests and knowing that it would be politically expedient to promote the utilization of non-forested lands, sold them to small colonies, farmers, and cattlemen, area residents, for 2 to 5 pesos per hectare, only 25% of the real value. Easy terms were given and the only conditions for the sale were that in the event of the existence of commercial pine forests within their boundaries, the company would be allowed to exploit them in accord with the purposes stated in the Decree which formed the Unit.

In 1961, the company granted the Departamento de Asuntos Agrarios y Colonización title to 63,973 hectares destined to the establishment of new population centers. By 1962, only 239,276 hectares of forest belonged to the company, Bosques de Chihuahua, while the remainder of the land contained within the Unit had been sold or donated to other individuals, groups or organizations. There seems to be some confusion as to the amount of land actually held by the company, or anyone else for that matter, since in 1971 the following
the recent re-distribution of land in the northern state of Chihuahua, where the government re-distributed 738,000 hectares to the benefit of about 7,000 peasants. Politically this was interesting because 257,000 hectares belonged to a powerful local company, Bosques de Chihuahua, S. A. . . . The government created in its place an ejido forestal (sic), which will now be the largest supplier of raw material to Celulosa (145). Whether the company actually held as much as 257,000 hectares of land is a moot, albeit an interesting question since it now holds no land at all and is entirely dependent upon maintaining its concession. 

The Forest

The condition of the forest varies from young second-growth to 'virgin' old-growth with differing amounts of slash on the forest floor. The dominant species under development is the ponderosa pine, although several other species exist. The subdominant species are the oak, madroño and junipers. There are, however, two general categories of industrial forest: 1) the immature second-growth, 40 to 50 years of age of normal density, located in the middle eastern part of the southern half of the Unit; and 2) the partially exploited virgin forest throughout the remainder of the Unit. 

Species

Among the commercial species of trees found in the forest of
Bosques de Chihuahua are several species of pine. They are:

- Pinus engelmannii
- Pinus leiophylla var. chihuahuana
- Pinus durangensis f. quinquefoliata
- Pinus arizonica var. stormiae Martínez
- Pinus ayacahuites
- Pinus herrerai Martínez
- Pinus pseudostrobus

Also of commercial value are the Pseudotsugas and Abies concolor Gord & Glend-Hoopes. None of the other species of trees are considered to be of commercial value, although they are important because they must be controlled by means of thinning to prevent them from replacing felled pines. In fact, at the writing of the most recent Forest Development Study, the company was requesting an annual allowable cut for possible use as cellulose, firewood or any other use that might be devised. These other important species include the oaks (Quercus), madroño (Arbutus) and the tascates (Juniperus).

Management Practices

Until June, 1957, forest development was directed toward the harvesting of developable dead wood and the selection of live individuals and groups of trees with a minimum diameter of 45 centimeters. Beginning in July of that year, the removal of all damaged trees and all trees whose growth increment was practically null was included. An instructive on 'Marking and Areas of Cutting' indicated that dead and damaged trees were to be marked prior to the marking of any live
trees, and that all slash was to be cleaned from the felling area on a day to day basis. Unfortunately, this has not proved to be the best method of treatment as it has been recognized that the products thus obtained are of inferior quality. Furthermore, between 1955 and 1962, 2.3 m$^3$ per hectare of dead pine including bark and branches had been removed; yet upon completion of a new inventory, 2.2 m$^3$ per hectare of the same type of material was recorded in the same area.

The authorized 'intensity of felling' is 45% by standing volume; however, in actual practice, it varies from 30 to 42%. This is accounted for in that the volume authorized includes the dead and damaged trees discussed in the previous paragraph.

**Harvesting Operations**

Much of the harvesting is on the basis of thinning in immature forest, although as indicated, harvesting in 'virgin' or mature forest areas furnish most of the industrial product. The operations in the forest are mostly mechanized; however, some of the yarding and loading is accomplished with the use of animals, and some of the felling and bucking is done with axes and crosscut saws. The hauling of the logs at the Unit of Bosques de Chihuahua is by means of large farm-type trucks. Since part of the forest materials are used in the cellulose industries, the logs are debarked in the field using axes.
Reforestation

On the basis of cost, natural reforestation is the most desirable; however, if the seed for the proper species is not available in the area, some other form of reforestation must be used. In the higher areas of the forest of Bosques de Chihuahua the climate tends to be more humid with less evaporation, given the availability of seeds, natural reforestation is relied upon. In the lower areas, which are less humid with higher evaporation rates, it is often necessary to reforest artificially. It seems clear that even here, seeding is the best method, since it is less expensive, more closely approximates natural conditions and gives better results than reforestation by planting seedlings. In any event, the requirement of the law; i.e., maintaining nurseries and reforestation, seems to be fulfilled.

Social Services

Bosques de Chihuahua and the associated industries appear to invest more money in their workers than do other Units; however, this is a subjective judgment. On the objective side, the housing is far more substantial than in other areas (as rightly it should be considering the more rigorous climate in northern Mexico). There also seems to be a greater effort to establish individualized homes than on other units. At least this is true at Mesa del Huracán. Whereas at other
Units, the schools are rather drab, depressing buildings in outward appearance, the school at Mesa del Huracán gives the impression of being more modern and serviceable.

The company also furnishes teachers, medical clinics and services, free transportation to markets (by means of its own railroad), and athletic facilities as prescribed by the law. There is even a hotel at Mesa del Huracán which is a new, modern building with very comfortable facilities. It is furnished for visiting officials and other guests.

In summary, the six selected field observations reveal that the organized forest concession units are, in fact, practicing adequate silviculture and respect the forest laws. One may properly assume that at least most of the concession units under government supervision are practicing equally good forest management. The impact of the forest laws and policy in Mexico today appears to be favoring dynamic conservation and rational utilization instead of the former policy of preservation.
CHAPTER VII

CONCLUSIONS

The evolution of forest resource laws, regulations and policy in Mexico analyzed in this thesis reveals a long history of varying degrees of concern and attitudes toward the forest resource. It is apparent that during the Colonial Period, there was no rational development policy and, as a result, forest resources were squandered and to a considerable extent, even destroyed. During the Nineteenth Century, a rational policy began to be promoted, but in the end, it was translated into a policy of preservation and protection rather than optimum use and dynamic conservation.

The post-Revolution Period was characterized by a carry-over of the preservationist policy and the actual prohibition of forest resource development on several million hectares of forest land. Unfortunately, the prohibitions inhibited all forest activity and commonly promoted unregulated and illegal uses and harvests, thereby allowing the forest to deteriorate. In some areas, the campesino came to view the forest as a hinderance to his well-being and destroyed it for agricultural purposes.

By the 1940's it was realized by interested legislators and foresters that a policy of rational utilization with a strong law was necessary if Mexico was to retain her forests. Thus, in 1943,
Mexico's second forest law of the Twentieth Century was promulgated. This law provided the organizational means to promote rational forest utilization and conservation. The organization provided was the Industrial Forest Exploitation Unit authorized to combine small forest ownerships under long term concessions. With the establishment of these Units came the requirement for professional foresters to plan and manage commercial forest exploitation, mandatory reforestation and other measures for conservation of the forest and forest soils.

The body of forest laws and regulations currently in force in Mexico was enacted in 1960 and in reality is little more than a refining of previous documents, especially that of 1943. On the basis of the evolution of Twentieth Century forest laws and forest policy and their influences on forest activity, the following conclusions appear justified.

1. Mexico now has a more than adequate body of laws and regulations sufficient to optimize utilization and to assure a dynamic conservation of her forest resources.

2. Following centuries of unregulated forest exploitation and destruction, government supervised forest unit concessions currently appear to be providing adequate silvicultural practices for a major portion of the remaining forest resources of the country.

3. Inadequate enforcement and implementation of forest regulations appears evident with respect to unorganized forest land areas.
and especially with reference to campesinos living within the forests.

4. There appears to be inadequate recognition of forestry at high government levels; for example, forestry receives only 11.5% of the Budget of the Secretary of Agriculture. Hence, government programs in forestry are hampered by a lack of funds.

5. There appears to be a lack of continuity and a tendency toward maintaining a status quo in forest policy matters resulting from a general turnover of appointed officials following each presidential election.

6. There is a critical need for many more foresters and for funding of positions to employ them. As of 1969, there were less than 400 foresters exercising their profession (34:23)--a number clearly inadequate to provide realistic management and supervision of Mexico's forest lands.

In summary, the analysis makes clear that there has evolved in Mexico an exemplary body of laws and regulations sufficient to optimize forest utilization and to assure dynamic conservation of the resource. More regulations are not needed, but there is critical need for greater funding at the Federal level to implement existing regulations and expand education of the public toward the end that the citizenry appreciates and respects forest values.


Herrera Bazán, Severino and Norberto Sánchez Mejorada. Aspectos Generales sobre la Administración Forestal en


APPENDICES
### APPENDIX I

**HIGHLIGHTS OF MEXICAN FOREST POLICY DEVELOPMENT--A CHRONOLOGY**

<table>
<thead>
<tr>
<th>Period</th>
<th>Date</th>
<th>Law or policy factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Columbian</td>
<td>1252-</td>
<td>Siete Partidas (Rome)</td>
</tr>
<tr>
<td></td>
<td>1284</td>
<td></td>
</tr>
<tr>
<td>Colonial</td>
<td>1496</td>
<td>Pragmática de los Reyes Católicos (Spain)</td>
</tr>
<tr>
<td></td>
<td>1518</td>
<td>Ordenanza de Carlos V--Reforestation (Spain)</td>
</tr>
<tr>
<td></td>
<td>1533</td>
<td>Principle of Equality (Spain)</td>
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<tr>
<td></td>
<td>1559</td>
<td>Law XIV--began public intervention (Spain)</td>
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<tr>
<td></td>
<td>1579</td>
<td>License to cut wood required (Spain)</td>
</tr>
<tr>
<td></td>
<td>1622</td>
<td>Mahogany, cedar and oak reserved for Spanish Armada (Spain)</td>
</tr>
<tr>
<td></td>
<td>1803</td>
<td>Ordenanza para el Gobierno de los Montes y Arboledas (Spain)</td>
</tr>
<tr>
<td>Independence</td>
<td>1810</td>
<td>Forests and other lands belong to Indians (Mexico)</td>
</tr>
<tr>
<td></td>
<td>1824</td>
<td>Gave control of forests to states</td>
</tr>
<tr>
<td></td>
<td>1852</td>
<td>Established Secretaría de Fomento--took control of forests</td>
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(Continued on next page)
Appendix I. (Continued)

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<thead>
<tr>
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<th>Law of policy factor</th>
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<td>First Forest Law of Independent Mexico--Reglamento de Corte de Arboles en Terrenos Nacionales</td>
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<tr>
<td>Regime of Maximilian</td>
<td></td>
<td>Proyecto de Ordenanzas de Bosques, Arbolado y Exportación de Madera</td>
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<tr>
<td>Díaz Regime</td>
<td>1878</td>
<td>Circular to correct abuses and excesses in forest</td>
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<tr>
<td></td>
<td>1880</td>
<td>Environmental concern due to forest destruction</td>
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<td></td>
<td>1894</td>
<td>Reglamento para la Explotación de Bosques y Terrenos Baldíos y Nacionales</td>
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<tr>
<td></td>
<td>1901</td>
<td>Junta Central de Bosques</td>
</tr>
<tr>
<td>Revolution of 1910</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post -Revolution</td>
<td>1917</td>
<td>Article 27 of Constitution</td>
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<td></td>
<td>1923</td>
<td>Proyecto of Mexican Forest Society</td>
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<tr>
<td></td>
<td>1926</td>
<td>Forest Law</td>
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<tr>
<td></td>
<td>1927</td>
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</tr>
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<td></td>
<td>1928</td>
<td>Reform and policy changes</td>
</tr>
<tr>
<td></td>
<td>1943</td>
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</tr>
<tr>
<td></td>
<td>1944</td>
<td>Bylaws</td>
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<tr>
<td></td>
<td>1948</td>
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<td></td>
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<tr>
<td></td>
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<td>Bylaws</td>
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</tbody>
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National Forest Program
APPENDIX II
GLOSSARY

Asociación Civil (A.C.)

An Asociación Civil (Civil Association) is a form of corporate organization with functions which are legally limited to non-profit activity and restricted from conducting certain forms of commercial participation (114:150).

Cámara Nacional de las Industrias Derivadas de la Silvicultura (CNIDS)

CNIDS is an organization created in compliance with the laws of Mexico to group together all industries involved in the industrialization of forest resources. The function of the Cámara is essentially that of a lobby; however, since most of the political power is vested in the Executive branch of the government, the Cámara functions mostly in the capacity of public relations and economic research.

Comunidad (Community)

A land tenure system in which the lands are held in common or joint ownership. A community is distinguished from the ejido by virtue of its more distinct communal organization, whereas the ejido contains elements of individual use rights.

Concession

A concession is an authorization for a specified use of a stated parcel of forest land over a specific period of time. The Industrial Forest Unit, for example, will be granted executive authorization to exploit a particular area of forest for the purpose of supplying a specified industry with raw materials. The time period is normally for 25 years, but may be renewed. The authorization is issued only after completion of thorough studies to determine the advisability of making the authorization.

Dynamic Conservation

A term which is used to imply not only the maintaining of the forest, but also its management in such a manner as to improve the resource for further development. This concept is diametrically opposed to the earlier Mexican idea of conservation, which in reality was tantamount to preservation without silvicultural management.
Ejido

A land tenure regime under which land is granted to a group of at least 20 eligible heads of families. The land is obtained by the government for redistribution by means of expropriation of private land or the use of public lands. The amount of land granted per individual family head depends upon the character of the land. If the land is irrigable, 25 acres is granted per ejidatario (head of the family), if cropland is not irrigated, the ejidatario may receive 50 acres of land. These limits have not always existed nor have they been observed and, as a result, agricultural ejidos have often been woefully deficient in terms of land.

Recently, forest ejidos have been established. The amount of land granted to the forest ejidos depends upon the quality and value of the forest products; however, it may be assumed that much larger areas will be involved than in the agricultural ejidos.

In no case may ejidal lands be sold, subdivided or mortgaged, albeit the crops may be mortgaged and excess pasture land may be rented on an annual basis.

Instituto Mexicano de Recursos Naturales Renovables (IMRNR)

The IMRNR is an Asociación Civil created for the purpose of investigating the condition of the renewable natural resources of Mexico, to advise in matters of conservation and utilization of resources for the collective benefit, and to wage a campaign of education and propaganda in an effort to bring before the public the importance of adequate management of renewable natural resources. The Institute receives its funding through private sources and is, therefore, not under government dictates.

Maderas Corrientes

Maderas Corrientes refers to wood, other than Maderas Preciosas.

Maderas Preciosas

This term is used to refer to certain tropical hardwoods, such as mahogany and red cedar (Cedrela), that because of their quality, are particularly valuable and are in great demand, especially as veneer or plywood.

Monte Alto

Spanish term referring to taller timber-yielding trees.
Monte Bajo

Spanish term referring to shrubs, herbs and, in general, smaller forest species.

Municipio

A legal state subdivision analogous to a county or a township of the Northeastern United States.

National Forest Reserves

All idle, surplus or excess national lands that are forested or are appropriate for forest cultivation (Article 59, 1960 Forest Law).

Protected Zone

Forest areas set aside for the purpose of protecting the soil, maintaining and regulating the groundwater regime and improving the health conditions for the people, or any other convenient purpose. These areas will include watershed areas, those near population centers, those within 200 meters of highways or roads and those declared to be strategic by the Secretary of Defense and Navy. Exploitation is not prohibited.

Sociedad Anónima (S. A.)

An anonymous society or a form of business organization which is incorporated for the purposes of commercial operation. The structure is such that the identity of the participant need not be revealed. Certain types of activity such as forest exploitation can only be conducted by Mexican nationals, and these organizations cannot operate as S. A. (114:161).

Sociedad de Responsabilidad Limitada (S. de R. L.)

A form of incorporated business organization in which the members furnish individual identity. This corporation is formed to conduct commercial activity (114:161-62).

Veda (Prohibition)

A specific forest area which is withdrawn from commercial production for the purpose of improving the silvicultural conditions of the area. Those species in need of improvement and the steps necessary for improvement are indicated in the decree which removes the area from production. Any land tenure system may be included and in some cases exploitation may take place, but it must be carried out by the Forest Service.