

THE WATER HYACINTH PROBLEM IN CEYLON

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WATER Hyacinth (*Eichhornia crassipes* Solms.), which is a native of the tropical and sub-tropical regions of South America, has now become a weed of importance in many parts of the world where climatic conditions favour its growth, notably the Southern United States of America, Australia, India, Siam, Java and other eastern countries. Its introduction into Ceylon is said to have taken place in 1905 when it was imported as an ornamental plant.

The plant is objectionable for many reasons. In certain countries it constitutes a serious hindrance to the navigation of mechanically-propelled vessels in rivers as well as to that of smaller craft. It has been known to cause bridges to be washed away during floods following the banking-up of masses of the weed against the piers. By over-running low-lying and moist areas many valuable aquatic fodder grasses have been exterminated resulting in the disappearance of extensive grazing grounds in areas where these are already insufficient for the requirements of the inhabitants. It is also a serious weed of paddy fields.

In Ceylon it completely covers the surfaces of tanks from which it passes to the irrigation and drainage channels of paddy fields as well as to the fields themselves where, if uncontrolled, it rapidly takes possession of the land. Its presence in supply and drainage channels so interferes with the flow of water that it is impossible to regulate its proper supply during the critical stages in the cultivation of paddy. Large areas of fertile paddy land in the Island have been converted into abandoned swamps owing to the blocking of the drainage channels by the weed which also, in other areas, causes the stagnation of water required for human and animal needs rendering such areas insanitary, malarious and generally unhealthy.

The control of Water Hyacinth in the regions where it has become established and the limitation of its further extension to new localities are, therefore, matters of the utmost importance to the welfare of Ceylon. The present distribution of the weed is, more or less, accurately known and a record is in existence of every known infestation with particulars of its location and previous history.

ALLIED PLANTS IN CEYLON

The plant possesses many local names among them being "Jabara", "Japan Jabara", "Yabara", "Yapura", "Sabara", "Habara", "Habarala", "Diya Habarala", "Diya Beraliya" and "Diya Kehel". Of these the name in most common use is "Japan Jabara" or merely "Jabara". Unfortunately, owing to the superficial resemblance of the flowers of Water Hyacinth to those of certain indigenous plants which belong to the same natural order (*Pontederiaceae*) the Water Hyacinth plant is not always recognized as such and, for this reason perhaps, its prompt eradication from new situations has not always followed its introduction as rapidly as was desirable. The two plants with which Water Hyacinth is most commonly confused are *Monochoria vaginalis* and *M. hastata* to both of which the local name "Diya Habarala" is applied. The former may be distinguished from Water Hyacinth (*Eichhornia crassipes*) by its smaller and darker blue flowers and the latter by the possession of arrow-head shaped leaves, while both lack the bladder-like expansions of the leafstalk bases which are so characteristic of *E. crassipes*. The flowers of Water Hyacinth are mauve in colour and may be further distinguished from those of the indigenous relatives, with which they are so often confused, by the presence on the upper portion of the flower of a blue area having a bright-yellow and pear-shaped central spot. The leaves of *E. crassipes* are ovoid and fleshy and the plant either floats on the surface of water, where the depth is sufficient, or takes shallow root in swampy areas. The species of *Monochoria* are firmly rooted in the soil and never occur as floating plants. There are other important morphological characters which separate these kindred plants but those already mentioned will serve to distinguish them.

The rootstocks of *Monochoria hastata* are used by vederalas in Ayurvedic medicine, while *Eichhornia crassipes* has no medicinal value.

Another plant with which Water Hyacinth has been confused is *Commelina benghalensis* (Nat. ord. *Commelinaceae*) which is known locally as "Diya-Beraliya" or "Diya Meneriya" but the flowers are smaller, darker blue and of a different shape and the leaves are evenly distributed along the stem while those of *E. crassipes* all arise from the base of the stem. Also, this plant grows in dry land and is a common weed throughout the Island.

METHOD OF PROPAGATION

Water Hyacinth is propagated both by seed and, vegetatively, by the production of stolons from the base of the plant, the latter method being the chief means by which the plant rapidly covers large areas of water surface. These runners fracture in time and the young suckers then embark upon an independent existence drifting with the aid of wind and currents to distant situations. The swellings at the bases of the leafstalks serve as floats and the leaves themselves perform the function of sails. During floods the plants rise with the water level and are thus carried considerable distances, being deposited in new situations, often in the form of a dense carpet, when the flood water subsides.

The inflorescence lasts for a day only, when the flower stalk bends over. The seeds do not germinate until they have undergone a desiccating process which may be delayed for two or more years. Tanks which depend upon rain water only, and dry out in periods of drought, fulfil these requirements and the result is a crop of seedlings when the next rains occur. The delayed germination of the seed of this weed indicates the need for prolonged surveillance over all areas which have, at one time, been infested with plants which have reached the flowering stage.

METHOD OF DISPERSAL

The extremely rapid spread of the weed in all new countries to which it has been introduced has led to every possible mode of dispersal being examined. The possibility of the seed being carried by birds or by the air may be dismissed. The weed has certainly been widely-distributed, both in other countries as well as in Ceylon, by floods and by its passage as a floating plant down waterways but here, as elsewhere, there is no doubt that human agency has been mainly responsible for its carriage to remote centres. In Ceylon this has been done, chiefly, in ignorance of the dangerous properties of the weed and the need, even to-day, for disseminating, as widely as possible, knowledge

regarding the noxious nature of the plant is very apparent. At the present time the true reason underlying Government's anxiety to eradicate this weed is not generally appreciated and a number of other erroneous beliefs are current among the people, the most prevalent and persistent of which, in all areas concerned, is that the flowers yield a mauve-coloured ink which is employed by counterfeiters in the preparation of Re. 1.00 currency notes. So long as such opinions are held it cannot be expected that the whole-hearted co-operation of the peasant population will be enlisted in a campaign which aims at the extermination of this harmful weed. If, however, by educational means and suitable propaganda the smaller landowners can be induced to understand that they may, in time, be robbed of their land by this weed their interest may be awakened and their co-operation enlisted on the side of Government in the campaign against this plant.

HISTORY OF THE WEED IN CEYLON

Following the original introduction of Water Hyacinth into the Island the plant underwent a rapid distribution to new centres chiefly, no doubt, for the sake of its beautiful flower. The first official recognition of the presence of this plant in Ceylon, appears to have been during 1907 by Dr. J. C. Willis, the Director of the Royal Botanic Gardens, Peradeniya. He lost no opportunity of urging all who possessed specimens of the plant to destroy them and, generally, met with success. He hoped that his activities had led to the destruction of all specimens of the plant in the Island, but learnt, in 1908, that it had spread to new situations and was actually being hawked in Colombo. He then published a note in which he emphasized the objectionable characters of the weed and the need for its immediate eradication predicting that, in the event of its escape to waterways, much trouble and loss would result. The next step, early in 1909, was the introduction of "The Water Hyacinth Ordinance" No. 4 of 1909 which made it an offence liable, on conviction, to a fine not exceeding Rs. 100.00:—

1. To import Water Hyacinth into the Island.
2. For any person to possess Water Hyacinth, or to allow the same to grow in, or on, any place belonging to him, or under his control or management.
3. For any person to fail to destroy by fire the Water Hyacinth plant on any place belonging to him, or under his control or management.

Unfortunately, the provisions of this Ordinance do not appear to have been enforced either with vigour or with system with the result that the weed rapidly spread to areas far distant from Colombo.

By 1922 the infestations in the Southern Province, particularly in the Tangalle area, were so extensive that a special effort was made by the Department of Agriculture to clear them on behalf of the owners. Towards the latter part of that year, with funds especially provided by Government for the purpose, twenty tanks with their attendant waterways were clean-weeded and also six miles of the Urubokka Oya. No effort was made by those on whose behalf this work was undertaken to maintain the weeded areas free from new seedling growth with the result that all the cleared areas became seriously re-infested in a short time.

In 1926 records of the appearance of the weed in a large number of centres in the Western, North-Western, Central, Sabaragamuwa and Southern Provinces were received and the plant was then declared as a weed under "The Plant Protection Ordinance" No. 10 of 1924. By this time the position probably far exceeded the possibilities visualized by Dr. Willis in 1908 when he appealed for drastic action to limit any further extension of this unwelcome importation.

EARLY ATTEMPTS AT CONTROL IN CEYLON

Prior to October 1926 the control of Water Hyacinth was provided for under "The Water Hyacinth Ordinance" with which the Department of Agriculture was not immediately concerned but subsequent to this date the Department took a direct interest in the problem as officers of the Department were responsible for the administration of "The Plant Protection Ordinance". The duty of Water Hyacinth eradication became the immediate concern of the Plant Pest and Disease Inspection Division of the Department and an intensive campaign was embarked upon. The main feature of this campaign was that Government would undertake the initial clearing of the larger infestations, handing them back to the owners who would become responsible for their subsequent maintenance. Large sums have been spent annually for this purpose, particularly in the Southern Province but, unfortunately, not with the result which might have been expected. The failure of this policy was due, mainly, to the apathy of those for whom the work was

undertaken, no endeavour being made on their part to consolidate this work by attending to seedling growth, the appearance of which was to be anticipated. It was hoped, no doubt, that Government would continue to make periodical clearings until the weed had disappeared, a hope which was justified by repeated clearings of certain infestations being undertaken by Government. The payment of wages, often far in excess of those prevailing in the district, provided a remunerative form of employment in certain areas and there has been reason for believing that fresh infestations were deliberately started in new situations in order to provide work for which good wages could be expected. The staff at the disposal of the Inspection Division, even at its maximum strength, was quite inadequate to insure an efficient supervision of the infested areas, which was only one of the duties required of the Division, with the result that little headway was made in the campaign and the weed continued to spread.

A NEW POLICY OF CONTROL

In 1930 the Inspector, North-Western Division, stationed at Kurunegala, conceived the idea of reverting to "The Water Hyacinth Ordinance" in preference to continuing the campaign under "The Plant Protection Ordinance". The essential principle underlying this proposed change of policy was to place the onus of responsibility for weed clearance upon the owners, or those directly responsible for the control of areas infested by the weed, the problem which had indicated the necessity of a change of policy being that of dealing with village tanks which constituted the majority of the infestations. The persons who are immediately responsible for the control or management of village tanks are the Vel Vidanes who, although unpaid officers, receive recompense for their duties in kind, usually a portion of the paddy crop which has depended for its production upon the water stored in the tank controlled by the Vel Vidane concerned.

This policy was initiated as an experiment in the North-Western Province with the sanction and co-operation of the Government Agent and proved an unqualified success. It was then extended to the Colombo District of the Western Province with similar success. All weeding at Government expense ceased in these provinces and in a short period of time the people become reconciled to the change and accepted their responsibilities in the matter.

During the past year the same policy has been extended to the Southern Province and, owing to the co-operation of the Government Agent, and Assistant Government Agents of Matara and Hambantota, much headway has been made. As was to be expected, this change of policy was not at first appreciated in the Southern Province especially by Vel Vidanes who had previously been the contractors for clearing operations in the areas for which they were themselves responsible. However, the progress which has been made can be regarded as highly satisfactory.

LEGAL PROVISIONS FOR CONTROL

Although the responsibility for the majority of the infestations has now been assigned to the proper quarter under the provisions of "The Water Hyacinth Ordinance" use is still made of "The Plant Protection Ordinance" also, and all inspecting officers are appointed under the latter Ordinance. By this Ordinance the prescribed control measures are as follows:

"All Water Hyacinth plants must be uprooted and cleared away from any place where they are growing and must be piled on high ground in heaps and subsequently burnt with fire".

The penalty for a breach of this regulation is, on conviction, imprisonment of either description to a term not exceeding three months or to a fine not exceeding Rs. 500·00 or to both.

Provision also exists for the control of Water Hyacinth under "The Village Committees Ordinance" No. 9 of 1924 and "The Irrigation Ordinance" No. 45 of 1917 (as amended by No. 18 of 1919, No. 21 of 1920, No. 22 of 1922 and No. 17 of 1927). At present the former Ordinance, so far as it concerns this weed, applies only to certain sub-divisions of the Chief Headmen's Divisions of the Kurunegala District where serious infestations have occurred. A rule has been adopted, for the areas concerned, empowering the Irrigation Headman, or, in his absence, the village Headman, to enforce labour for the purpose of ordering the removal of Water Hyacinth and other similar plants which tend to diminish the capacity of any village tank.— (*Government Gazette* No. 7741 of October 18th, 1929). Under "The Irrigation Ordinance" the proprietors within the Chilaw Irrigation District have passed a rule under which all persons benefitting by a supply of water from a tank may be called upon,

as an emergency measure, to remove Water Hyacinth, and other similar pests, which tend to diminish the capacity of the tank concerned.—(*Government Gazette* No. 7866 of July 3rd, 1931).

It has not yet been possible to extend similar rules to other districts but it is hoped that this may be done at a later date in the event of the present machinery proving inadequate.

CLASSIFICATION OF INFESTED AREAS

The areas now known to be infested, or which are likely to become infested in the future, fall conveniently into the following categories:

1. *Major Tanks and Irrigation Channels*.—These are under the control of the Irrigation Department which is thus responsible for maintaining them free of this weed. Certain large tanks have been seriously infested in the past but have been cleared. New growth is dealt with as it appears and at the present time the situation in regard to these infestations is satisfactory.

2. *Village Tanks*.—These form the majority of the infestations in the Island and are under the immediate control of minor Headmen of the Provincial Administration, who are Korals, Arachchies, Police Vidanes and Vel Vidanes according to districts. These officers are guilty of an offence, under Ordinance No. 4 of 1909, if they allow the weed to grow in areas under their charge. Their responsibility in this connexion has been indicated to them by their respective Government Agents and cases of negligence are reported to the Government Agents for disciplinary action.

3. *Rivers*.—Main rivers are under the control of the Government Agents who thus become responsible for controlling the weed in the sections of the rivers which pass through the territory under their administration. Where, however, smaller streams are dammed at certain seasons by the construction of temporary *amunas* for the purpose of irrigating the adjacent paddy lands they become village irrigation works. Often, a number of such dams occur in a small stretch of river with one or more Vel Vidanes in charge of each section. In such cases, the responsibility for maintaining these waterways free of Water Hyacinth devolves upon the particular officer who is responsible for the irrigation of the area served by the section of the stream concerned.

4. *Canals*.—The Public Works Department has accepted responsibility for the clearance of Water Hyacinth from canals under the administration of the Department, but, up to the present time, no instances of these waterways being infested have been reported.

5. *Private Lands*.—These include swamps, elas, ponds, drains, wells and other areas of water on privately-owned land and the parties responsible for the eradication of the weed from such areas are those to whom they belong or to whom their control or management has been entrusted.

6. *Crown Areas*.—The infestations which fall under this head are waterways, swamps and other areas of unoccupied territory belonging to the Crown and the responsibility for maintaining them free from weed devolves upon Government and they are the immediate concern of the particular Revenue Officer under whose control they happen to be.

THE PRESENT POSITION

As previously mentioned, the responsibility for Water Hyacinth control was entrusted to the Plant Pest and Disease Inspection Division of the Department which was formed in 1919. This organization consisted of three Inspectors with headquarters at Peradeniya, Kurunegala and Galle, respectively. Three, or four, sub-inspectors and a clerk were attached to each of these centres. In September 1932, partly as a retrenchment measure and partly due to a scheme of re-organization of the Department of Agriculture, the Inspection Division was abolished. The work formerly performed by this Division was then re-distributed, the duties of the former sub-inspectors devolving upon the Agricultural Instructors, in addition to their normal duties, under the immediate direction of the Divisional Agricultural Officers who now exercise the functions of the Inspectors under the old scheme in addition to their own. The responsibility for co-ordinating the work connected with all pests, diseases and weeds, declared as such under "The Plant Protection Ordinance" No. 10 of 1924, has been assigned to the Assistant Entomologist under the additional title of Controller of Plant Pests. The latter officer is stationed at Peradeniya and has a staff of two inspecting assistants and a clerk. It should be mentioned that Water Hyacinth is only one of the twelve declared pests and diseases with which this new organization is concerned.

It is the immediate duty of the Agricultural Instructors to keep in touch with the situation in regard to Water Hyacinth in their respective ranges. By frequent inspections of all known infestations, upon which monthly reports are furnished to the central office at Peradeniya, the position in each Agricultural Range is known and instances of neglect on the part of responsible parties to maintain their areas free are reported for necessary action. It is, also, the duty of these officers to explain to the residents in their ranges the true reason for Government's desire to eradicate the weed and to correct the many erroneous impressions which have been formed in this connexion.

During the past year, the inspection work in the Southern Province has been both regular and systematic with the result that much progress has been made towards reducing the situation to a condition in which it can be handled by the staff available. Unfortunately, there has been a tendency, in the North-Western and Western Divisions, to rely on the reports of the Vel Vidanes and Police Officers for information in regard to the condition of the infested areas in these Divisions rather than to check the information furnished by routine inspections, but it is hoped that more regular inspections will be undertaken in these Divisions in the future. Surprise inspections undertaken by the headquarters staff have, in many instances, revealed the fact that areas said to be free of weed were, in reality, infested. It is a very serious handicap to the administration of the campaign against the weed if absolute reliance cannot be placed upon the reports of inspecting officers. As, however, many of the Instructors have been new to this work some leniency is necessary but more serious notice will need to be taken of false reports in the future.

In the Southern Province certain works of importance have been undertaken during the year by the Irrigation Department on behalf of the Department of Agriculture. The object of these undertakings has been to reduce certain extensive swamps, infested by the weed, to a condition in which weeding was a practical undertaking.

The special works referred to above are in connexion with the Beminiyanwila, Kabaldetta and Kudawila drainage channels. The infestation of the Beminiyanwila Main Drainage Channel, over three miles in length, led to the conversion of a very extensive tract of paddy land into an uncultivable swamp which also became infested with the weed. It, further, prevented the

functioning of the Kabaldetta channel, a sub-drain serving another extensive tract which became a weed-infested swamp. Both of these channels have been cleared of weed and reconditioned by the Irrigation Department, sufficient infested land adjacent to the channels being cleared of weed to allow of them functioning efficiently. This undertaking has resulted in the escape of water from the swamps and weed clearance became possible during the dry weather in September. Seven of the eight extensive infestations in this area have been cleared and once more brought under cultivation. The remaining infestation still persists.

The reconditioning of the Kudawila drainage channel led to the reduction of the water level in the Kudawila swamp by nearly three feet and clearing not only became a possibility but the Water Hyacinth was actually withering for lack of moisture during September last. The swamp is now in a condition in which it can be cleared of weed. The proximity of this infestation to the main road between Tangalle and Hambantota makes it imperative that it should be brought under control. The weed has not yet penetrated to the eastern side of the Walawe Ganga and the danger of it doing so, and thence being conveyed to the extensive and fertile paddy areas in the Tissamaharama area, is one which it is necessary to guard against. Other preliminary works performed in the Southern Province by the Irrigation Department during the year in connexion with Water Hyacinth eradication were at Namayalawila, near Tangalle. This is the most extensive Water Hyacinth infestation in the Island and the most difficult of solution. The swamp is Crown-owned and densely infested by weed. The depth of mud being more than a man's height, makes clearing operations quite impossible until the swamp is drained. The area is subject to flood and is the source of Water Hyacinth infestation of some thousands of acres of paddy lands. The solution of this major problem is very desirable. A mile-long drain, six feet in width, has already been cut by Government but, owing to the annual practice of temporarily damming the Kirama Oya, into which the drain falls, the drain has so far failed to function. In order to benefit by the work which has already been performed it is necessary to provide direct irrigation facilities before the temporary dams

across the Kirama Oya can be dispensed with. The route of the proposed channels has been surveyed and other preliminaries completed with a view to cutting the channels during the close season early next year.

During the past year the work of the campaign has been directed to the supervision of all areas on the register of infestations, calling upon the responsible parties to cope with the infestations under their control which are capable of weed clearance and assisting the owners of difficult infestations by the provision of facilities which will render weeding a possible undertaking. As a result of continued pressure upon the responsible parties to remove the weed from their respective areas a very large percentage of the total infestations are now actually free of weed and can be maintained so if continued supervision is maintained and seedling growth removed as it appears.

Owing to the fact that the germination of seed may be delayed for several years it is necessary to maintain a constant watch upon all places on the register of infestations even if they have been free of the weed for the past two years. The need for this continued vigilance has been clearly demonstrated by the recent appearance of seedling growth in certain areas which had been free for three years prior to January 1933. Further, several places, regarded as infested and visited monthly, are now actually free of weed growth so that the present position is not quite as serious as the total number of infestations in twenty-two different Agricultural Ranges of the Island might lead one to suppose.

It will be seen from the following table that the largest number of infestations is in the Southern Province, particularly in the Hambantota District, which contains no less than 108 of the total 121 infestations in the province. Several new infestations have been reported during the past year, none of them serious, and prompt action has been taken to deal with them. Many of these have been in the premises of Buddhist Temples where the plants were grown in flower pots for the sake of the ornamental flowers and from which there is the greatest danger of their spreading into neighbouring tanks.

The distribution of infestations, and their classification, are given in the following table.

**DISTRIBUTION OF WATER HYACINTH
INFESTATIONS IN CEYLON**

Agricultural Division	Agricultural Range.	Number of Water Hyacinth infestations			
		Free of weed for one year or more	Already under control or controllable	Serious infestations	Total
Central	Gampola	1			1
	Katugastota	1			1
	Kegalle	3	8		11
	Peradeniya	2			2
	Ruanwella		5		5
		7	13		20
North- Western	Chilaw	10	6	1	17
	Dandagamuwa	9	3		12
	Kurunegala	5	3		8
	Maho	7	2		9
	Polgahawela	4	3		7
	Wariyapola	8	12		20
		43	29	1	73
Southern	Ambalantota	4	16	1	21
	Bata-ata	13	22	6	41
	Batapola	2	4		6
	Galle	1	1		2
	Matara	2	1		3
	Weeraketiya	13	30	3	46
	Weligama	1	1		2
		36	75	10	121
South- Western	Bandaragama	8	9		17
	Gampaha	1	3		4
	Negombo	10	12		22
	Nugegoda	51	30		81
		70	54		124
Total		156	171	11	338

The total number of recognised infestations in the Island is, at the time of writing, 338. Of these, 156 have been free for one year or more and, with proper supervision, can be maintained free. A very large percentage of the 171 infestations classified in the above table as being under control, or capable of being controlled, are actually free of weed at the present time but new growth is constantly appearing and continued supervision is essential to prevent them from reverting to serious infestations. The balance of this number includes infestations which are slightly to moderately infested but are all clearable with the exercise of a little effort on the part of the responsible parties. Eleven of the total infestations are serious some being of considerable extent. They require Government aid before they are in a position to be properly controlled.

FUTURE POLICY

Although some headway has been made towards the solution of a difficult problem one is compelled to speculate upon the future position in regard to this weed in Ceylon and to consider whether there is any hope of its eventual eradication from the Island. Total eradication, even at this stage, is not an impossibility but it must be some years before this goal can be attained, and then only if the universal co-operation of all residents in the affected districts, combined with that of all official bodies, can be secured. The alliance of all official organizations interested in attaining the objective one has in mind is to be expected but whether this can be supported by the populace to the degree necessary, and prior to the problem reaching a stage when it will be definitely beyond solution, is another matter.

In the comparatively short period of 28 years, the half-dozen plants introduced in 1905 gave rise to plants which spread over some thousands of acres of water, paddy and swamp areas. At present, so far as is known, the infested areas lie within the inhabited zones but if the plant succeeds in finding its way, through the agency of waterways, to the vast uninhabited regions traversed by some of the larger rivers on their way to the sea the solution of this problem will be indefinitely postponed. The same, to a less degree, may be said of the extensive low-lying areas which are subject to annual floods in the

vicinity of Colombo. For this reason, the infestations in the Western Province are of particular importance, especially those in the Nugegoda range which already number more than those in any other range.

The first duty of the new organization which has been created to deal with proclaimed pests, diseases and weeds, has been to compile an authentic register of all known infestations in the Island and this has not been an undertaking without difficulty. The next step was to compile information regarding each infestation, particularly in respect to its exact location, its past history and present degree of infestation. It then became possible to classify the infestations and arrive at some conception of the problem which had to be taken in hand.

The policy during the present year has been to maintain a constant supervision over the infested areas and, by frequent inspections, to maintain the areas which had already been cleared free of new weed growth; to insist on the weeding, by those responsible, of areas which were definitely clearable and to give State aid in cases where the work was beyond the powers of the owners to perform however willing their intentions in this matter might be. It is hoped, by a continuance of this policy, to reduce the majority of the infestations to a condition in which, by constant surveillance, they may be maintained free of seedling growth and their inspection will continue until such time as the appearance of such growth need no longer be anticipated. At the same time, an endeavour will be made to deal with the remaining and more serious infestations and, by drainage or other means, to reduce them to a condition in which clearing operations are capable of being performed by those who are responsible for their management.

It is proposed to limit State aid in this matter to operations of this nature and to the provision of boats to aid the collection of weed in deep water, and to discontinue the practice, which has been followed for some years, of removing, on Government account, the weed from properties for the proper maintenance of which others are directly responsible. This attitude has become necessary owing to the complete indifference and apathy displayed, in the past, by those on whose behalf large infestations have been repeatedly cleared of weed at Government expense, a sum of Rs. 30,000 having been spent in wages alone for this purpose during the past few years. If the indifference complained of had been limited to the poorer and less educated

classes a more tolerant view of this neglect might be entertained but the chief offenders have been landowners of consequence whose good example might be expected to exercise a very important influence upon the less influential proprietors in the districts concerned, an influence which would have been of considerable value to the campaign against the weed.

Although the control of Water Hyacinth is adequately provided for by local enactments it is desired to limit prosecutions to instances where serious opposition and obstruction are encountered. No prosecutions have been taken during the year but certain ones are pending, every possible avenue for peaceful settlement in these cases having failed.

The dissemination of knowledge regarding the noxious nature of this weed, the correction of the many erroneous ideas which have been formed concerning it and the indication of the pressing need for its eradication should, in time, assist in checking the deliberate spread of the weed by irresponsible or ignorant persons as is being done even at the present time. A preliminary step in the movement towards arousing a wider interest in this subject is to be taken, shortly, by the distribution in suitable centres of attractive coloured posters of the plant, appropriate slogans in Sinhalese also being incorporated in the posters. If this issue is well received, and is considered to be serving its intended purpose, the scheme will be extended as it is certain that lack of knowledge of the plant, and of its harmful nature, is largely responsible for its rapid and wide dissemination in the Island during the past 28 years. A re-issue of smaller coloured illustrations of the plant, accompanied by a descriptive pamphlet in Sinhalese, is also to be made in the near future to all headmen in the weed-infested areas.

As a result of the interest and co-operation of the Government Agents concerned, the mobilization of the large official force at their command brings into operation an efficient and existing organization which should be of the greatest value in the future campaign against this weed. Without the co-operation of the Provincial Administration it is certain that little or no progress could be made towards the efficient control of Water Hyacinth in the Island. The authority of the Government Agents in their provinces is considerable and, through the various links in the administrative chain, is brought to bear upon almost every inhabitant in the most remote corners of the country. This would be quite impossible to accomplish with

the comparatively small organization controlled by the Director of Agriculture who is primarily responsible for the administration of the Ordinance which exists for the control of pests, diseases and weeds in Ceylon. It is hoped, therefore, that the continued support of the Government Agents may be counted upon in the future and, if it is possible, that such aid should be forthcoming even in greater measure than formerly.

So far as is known at present the most satisfactory method of eradication, and the cheapest, is the removal of the weed by hand. Chemical treatment has been given an extended trial in other countries but there are objections to most treatments of this nature. The most satisfactory of these appear to be common salt and sulphuric acid, but it is proposed to continue experiments with Sodium Chlorate during the dry weather early next year. Many chemicals will destroy the foliage above the water level but the submerged vegetative portions remain unaffected. Arsenical solutions have been widely used in certain countries but they cannot be recommended for local use for many reasons. The most difficult problems in Ceylon are the swamp areas as it is not possible for them to be safely penetrated by men. For this reason spraying operations, even if a suitable weedicide is forthcoming, present special difficulties.

The interest of all who have the welfare of the country at heart is earnestly solicited in the campaign against this pestilential weed. Much can be done by persons of influence to foster the necessary interest and action among the residents in their districts. The discovery of new infestations should be reported to the nearest Agricultural Instructor or to the Controller of Plant Pests at Peradeniya.

The most pressing need at the moment, so far as the Water Hyacinth situation is concerned, appears to be the broadcasting of suitable knowledge regarding the plant. If public opinion can be aroused to the extent desirable more progress is likely to be effected in the direction of bringing this weed under control than has been possible in the past.