

THE CALIFORNIA STATE DEPARTMENT OF AGRICULTURE

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The activities of the Department of Agriculture, State of California, are of concern to all inhabitants of the state, and are in some phases of particular interest to botanists.

The Department was created in 1919 by the fusion of several governmental agencies already in existence. The officer whose title had previously been State Commissioner of Horticulture became Director of Agriculture and head of the department. The Board of Agriculture, which served as board of directors of the State Agricultural Society, managed the State Fair, and exercised various other functions, was continued in existence. In 1929 the Board of Agriculture was limited to advisory functions, for the better performance of which it has been armed, since 1933, with power to conduct investigations. It consists at present of eight members appointed by the Governor for overlapping four-year terms, together with an annually appointed president.¹ The management of the State Fair was assigned to the State Department of Finance, acting through a "State Agricultural Society" appointed by the Governor.² The Department functioned, formerly, under the authority of many acts of the legislature; in 1933 most of these were assembled in a single measure, the Agricultural Code.

Under the Code, the Director is responsible for essentially all the activities of the Department. He holds office during the pleasure of the Governor and receives a salary of \$6000 per annum. In practice, he acts through the many individuals who make up the personnel of the Department. He appoints the personnel, organizes subsidiary agencies, and assigns duties. As now organized, the department consists of an administrative staff together with six Divisions, respectively of Animal Industry, Plant Industry, Chemistry, Markets, Market Enforcement, and Weights and Measures. The larger Divisions, those of animal and plant industry, are subdivided into many agencies called "Bureaus" or "Services." The officers standing next to the Director, the Chiefs of Divisions, held office formerly at his pleasure; by a measure approved by the people at the recent election of November, 1934, they become members of the State

¹ In the words of the Agricultural Code, section 40, ". . . The president of the board of directors of the State Agricultural Society shall be the ninth member and president of the State Board of Agriculture . . ." and section 71, ". . . The president of the board of directors of the State Agricultural Society shall be designated annually by the Governor."

² Agricultural Code, section 70. "The State Agriculture Society is a State institution within the Department of Finance, and consists of a board of directors of fourteen members."

Civil Service. All subordinate employees of the Department, Chiefs of Bureaus, assistants, experts, inspectors, etc., were and are members of the Civil Service.

The Department is described as a regulatory and service institution. After study of the Code and of annual reports, one is able to describe the activities of the Department in such terms as these: it suppresses nuisances and maintains commercial standards throughout the range of domestic non-human life. The word "domestic" seems best to describe the limit separating interests of this department from those of the Department of Natural Resources; it is the latter that is concerned with fish and game, and with forests. In more detail, the functions of the Department include the following:

It licenses and inspects dairies and all business establishments handling dairy products, milk, butter, cheese, and ice cream, as well as legally permitted substitutes; tests the products mentioned for conformity to legal definitions and sanitary standards; forbids the sale of, or destroys, materials which do not conform.

It inspects beef and dairy cattle, also horses, sheep, goats, swine, poultry, bees, and other domestic animals; diagnoses disease, establishes local quarantines, and suppresses epizootics. Of all diseases, the one receiving most attention over a range of years has been cattle tuberculosis. With federal cooperation, tuberculosis control areas (now including something like half the area of the State) are established; in these areas, all cattle are tested; all that react positively are slaughtered; and the owners are recompensed.

It licenses and inspects abattoirs, and makes pre- and post-mortem inspections of slaughtered animals. The sale of meat without approval, which may be either federal, state, or municipal, is forbidden.

It registers brands and inspects hides and carcasses to prevent theft.

It licenses dealers in agricultural poisons, fertilizers, feeding stuffs, and seeds, and tests the goods sold for conformity to legal standards. The tests applied to seeds are for viability and for the presence of weeds.

It studies insects and the use of insecticides in the field; maintains quarantines and conducts campaigns of eradication against injurious insects.

It inspects hay, grain, and fresh fruits and vegetables. In some cases it merely certifies as to quality; in others it forbids the sale or shipment of inferior goods. In many cases it enforces the use of standard containers. At road inspection stations, citrus fruits are examined for frost injury; in laboratories, specimens of fruit from orchards are tested for spray residue. All plant material entering the state is inspected for the presence

of plants forbidden under quarantine regulations and for pests and diseases.

It watches out for diseases of cultivated plants and cooperates with the Federal Bureau of Entomology and Plant Quarantine in the enforcement of federal quarantines.

It conducts campaigns for the control of rodents, especially ground squirrels; and against noxious weeds. Camel thorn, an aggressive weed; the cultivated currant, a host of the white-pine blister rust; as well as all hosts of citrus white fly in citrus white fly districts, are, under the Code, public nuisances, subject to summary abatement. The Code includes a long list of other weeds which the Director is empowered to outlaw in limited areas within the state. In another place a definite list of species are legally defined as noxious weeds, with the requirement that their presence in agricultural seeds must be acknowledged on the label.

The department licenses and inspects nurseries. All nursery stock—defined as anything which is to be planted—must be inspected before shipment out of the county. Recent experiences had alarmed me with the notion that all plant material, including botanical specimens, must be inspected before shipment. As I read the law, it is not so unreasonable. Inspection is required, of all material to be planted; of all material from quarantined areas; and of material which is suspected for some other specific reason. Whether material to be shipped out of the state requires inspection depends upon Federal regulations and upon regulations at the destination.

The department licenses all warehouses and inspects them for the presence of insect pests. At the option of their proprietors, warehouses may be bonded; the department inspects bonded warehouses from the point of view of legality of business operations.

It licenses and oversees all dealers in agricultural products (with an exception in favor of cash buyers) to prevent any swindling of producers.

It gathers, in great detail, data as to volume of goods and prices in agricultural markets. The data assembled are made public at frequent intervals in mimeographed form or by radio.

It administers laws as to the manufacture and sale of mattresses and upholstered furniture and oversees the locally appointed sealers of weights and measures. The laws governing these last activities were deliberately not worked into the agricultural code; it seems probable that enforcement of these laws may eventually be assigned to some other agency of government.

The department prosecutes violators of the law, acting through local District Attorneys.

From this summary, it will be seen that the department is largely "self-supporting" by means of license fees.

Under the Code, County Boards of Supervisors are permitted to establish local agricultural administrations. The local officers are the County Agricultural Commissioner and the County Livestock Inspector, together with deputies as needed. Commissioners are appointed by Boards of Supervisors from among persons examined and approved by the Director. Their term is four years. Almost every county maintains a Commissioner. Livestock Inspectors require no qualifying examination, serve during the pleasure of the Board of Supervisors, and are permitted only a low maximum salary; in these facts one senses an expectation that the office may eventually be abolished and its functions transferred to the Commissioner.

The functions of the local agricultural officers are twofold: they are local agents of the Department, and are responsible to the Director; at the same time they are locally responsible for the enforcement of local regulations. The inspection of imported plant materials is carried out, at border stations, at airplane landings, at the important seaports of San Francisco, Los Angeles, and San Diego, and in the mail, freight, and express terminals in the same cities and in Oakland, by State Inspectors; at the less important ports of Eureka, San Luis Obispo, Santa Barbara, and Ventura, and at inland mail, freight, and express terminals in general, inspection is by Commissioners. Inspection required before shipping plant material is normally by Commissioners.

Before proceeding to an account of botanical investigation and publication by the department, a not unfriendly critic comments upon the organization as follows. This institution is on the one hand subject to damnation as a bureaucracy; on the other, it exemplifies the best modern theory of government. Responsibility is lodged in a high officer, an immediate deputy of the Governor, removable at pleasure; routine in a body of permanent professional public servants. The Board of Agriculture may be expected to serve, on behalf of the people and the agricultural community, the necessary function of criticism. One ventures the suggestion that the Board is not by law sufficiently independent of the Governor. Each Governor, when he has served slightly more than half of his term, has appointed a majority of the Board; and when he goes out of office he leaves a Board appointed entirely by himself. From a Board so constituted one expects no searching criticism of the Governor's other creature, the Director. This suggestion is not based on any specific happenings; the situation is the same as with many other boards belonging to the State Government, and cannot be said to cry aloud for reform. Similarly, in the use of locally appointed officers, the Commissioners, for the enforcement of State law, the Code follows good Californian precedent and practice rather

than abstract theory. It is the use of local officers that takes the curse of bureaucracy off the system.

Regarding research and the dissemination of information, the Department disclaims these as primary functions. They are primary functions of the University. Nevertheless, the routine work of the laboratories of the department yields data worthy of publication; and in emergencies, or when cooperation is altogether acceptable, research projects may be undertaken. There are several laboratories in the Department: a bacteriological laboratory, concerned largely with dairy products; a chemical laboratory for the analysis of insecticides, fertilizers, etc.; a laboratory and taxonomic collection for entomology; a mycological laboratory; and a seed laboratory. In connection with weed control, a herbarium has been started and plants are identified.

A periodical, the *Monthly Bulletin*,³ now (1934) in its twenty-third volume, is published. In defiance of the title, it has been appearing during these years of financial stringency in batches of two or more numbers, at irregular intervals. Scientific papers, as well as a variety of matter of departmental interest, appear in it.

Among strictly technical papers, a large proportion deal with entomological taxonomy. Many others discuss diseases of cultivated plants; others discuss insects on native plants, and methods of control. Mackie and Jones⁴ refer to the fact that European elm leaf beetle, a pest that threatens all our elms with destruction, and the obnoxious European elm scale, can be controlled by sprays applied with especially powerful pumps capable of elevating streams to the tops of the trees. The primary object of the paper cited is to report experiments carried out under normal operating conditions, which established the reassuring conclusion that the hazard of contact with power lines is negligible. More recently, Mackie and Haenggi⁵ have described methods by which control is achieved at a cost of only eleven cents per tree: this was accomplished in Sacramento, where large-scale operations are possible. In communities that cannot afford the overhead expenses there remains serious danger of the loss of all elm trees. Burke⁶ has presented a useful outline of the insects which may be expected on ornamental trees in gen-

³ Before 1919, *Monthly Bulletin of the State Commission of Horticulture*; now *Monthly Bulletin of the Department of Agriculture, State of California*. This title would be cited as *Monthly Bull. Dept. Agr. Calif.*, and is obnoxiously long; one remembers that Dr. Merrill suppressed *Tech. Papers Agr. Exp. Sta. Univ. Calif.*, and replaced it with *Hilgardia*.

⁴ Mackie, D. B., and M. L. Jones. An attempt to measure the hazard from power lines during spraying operations. *Op. cit.* 21: 196-203. 1932.

⁵ Mackie, D. B., and Charles Haenggi. Recent developments in elm leaf beetle control. *Op. cit.* 22: 346-350. 1933.

⁶ Burke, H. E. Summary of shade-tree insect activities in California for 1931. *Op. cit.* 21: 358-369. 1932.

eral. A paper by Salman⁷ includes an account of the unhappy ravages of the pine killing beetles of the genus *Dendroctonus*.

Articles on diseases of plants, in contrast to those on insect damage, are less numerous. Millbrath⁸ has written a brief summary of the situation. Root⁹ has described the measures being taken against the introduction and spread of white pine blister rust. The measure most relied upon, the eradication of the alternate host wherever necessary, is impressive when one considers the abundance of gooseberries and currants in our mountains. The cultivated black currant is said already to have been eradicated throughout the western states. Harris and Goss¹⁰ have described a disease of seedlings of species of *Andropogon*, in which the roots of the primary system and the mesocotyls turn red, wither, and die; the whole seedling dies unless the secondary system of roots is already well established. The disease appears sporadically, effecting small percentages of batches of seedlings; it seems not to be infectious, and no etiological agent was discovered. The authors conclude that it represents a physiological deficiency of some individuals. Weldon¹¹ has studied the delayed foliation of fruit trees. This condition, which appears in Southern California rather than Northern, and only in certain years, seems to be a response to the environment: when winters are unusually mild, trees from a harsher climate lack the stimulus to unfold their buds. Harris¹² has an article on cold injury. It was prepared and published before the great freeze of December, 1932, when oranges, eucalyptus, pepper trees, *Grevillea*, *Phoenix canariensis* Hort., some species of *Acacia*, and other natives of warm climates, suffered extreme damage. To the surprise of most people who witnessed the results of the freeze, many trees which were not promptly removed managed to go on living. A detailed account, by species, of the damage, would be most interesting.

In the field of economic mycology aside from plant pathology, Millbrath¹³ has an article on wood decay, as caused particularly

A detailed account of the most troublesome weeds of California by *Poria incrassata* and *Merulius lachrymans*.

⁷ Salman, K. A. Forest insects of the year 1932. *Op. cit.* 22: 131-137. 1933.

⁸ Millbrath, D. G. Plant diseases in California. *Op. cit.* 23: 197-200. 1934.

⁹ Root, G. A. Progress of preparedness for protecting sugar pine against blister rust. *Op. cit.* 21: 204-210. 1932.

¹⁰ Harris, M. R., and W. L. Goss. A seedling disease of sorghum and sudan grass. *Op. cit.* 23: 109-118. 1934.

¹¹ Weldon, G. P. Fifteen years study of delayed foliation of deciduous fruit trees in Southern California. *Op. cit.* 23: 160-181. 1934.

¹² Harris, M. R. Some examples of cold injury to plants in California during the winter of 1931-32. *Op. cit.* 21: 354-357. 1932.

¹³ Millbrath, D. G. Wood decay in buildings. *Op. cit.* 23: 95-102. 1934.

ifornia is appearing as a series of articles by Ball and Robbins,¹⁴ with beautiful colored plates by Lena Scott Harris. The whole of one number of Volume 22 is devoted to weeds. In addition to contributions of the Ball and Robbins series, we find discussions of weed control by Ball, Bottel, Crafts, Goodwin, Ryan, and Wren. The campaign against camel thorn seems to be yielding results and to promise complete success. In the same number are papers on the artichoke thistle; on the relation of weeds to diseases and insect pests; on the occurrence of weed seed in crop seed; on *Lepidium Draba* L., and on *L. repens* Bois. and *Hymenophysa pubescens* C. A. Mey., weeds confused with it; an account of the star thistles, genus *Centaurea*, which should be most useful in the identification of collections; and an announcement of an experiment on the viability of weed seeds. This experiment is planned to be continued over a period of thirty-six years.¹⁵ At various times Bellue¹⁶ has written other articles on weeds; noting the appearance of *Roripa austriaca* Spach and *Carduus neglectus* Ten., and (with Ball)¹⁷ discussing *Cyperus esculentus* L.

¹⁴ Ball, W. S., and W. W. Robbins. Russian knapweed (*Centaurea repens* L.) Op. cit. 20: 666-668. 1931.—Puncture vine (*Tribulus terrestris* L.) Op. cit. 21: 211-213. 1932.—Johnson grass (*Holcus halepensis* L.) Op. cit. 21: 287-289. 1932.—Bermuda grass (*Cynodon dactylon* Pers.) Op. cit. 21: 322-323. 1932.—White horse nettle (*Solanum elaeagnifolium* Cav.) Op. cit. 21: 348-349. 1932.—Canada thistle (*Cirsium arvense* Scop.) Op. cit. 21: 394-395. 1932.—Quack grass (*Agropyron repens* Beauv.) Op. cit. 21: 414-415. 1932.—Camel thorn (*Alhagi camelorum* Fisch.) Op. cit. 22: 258-259. 1933.—Spiny clotbur (*Xanthium spinosum* L.) Op. cit. 22: 278. 1933.—Perennial sow thistle (*Sonchus arvensis* L.) Op. cit. 22: 286. 1933.—Poverty weed (*Iva axillaris* Pursh) Op. cit. 22: 305. 1933.—Sandbur (*Cenchrus pauciflora* Benth.) Op. cit. 22: 318. 1933.—Heliotrope (*Heliotropium curassavicum* L.) Op. cit. 22: 379-380. 1933.—Klamath weed (*Hypericum perforatum* L.) Op. cit. 23: 103-108. 1934.

¹⁵ Ball, W. S. Weed control. Op. cit. 22: 252-257. 1933. Bottel, A. E. Introduction and control of camel thorn. Op. cit. 260-263. Crafts, A. S. Progress in chemical weed control. Op. cit. 264-268. Ball, W. S. Artichoke thistle (*Cynara cardunculus* L.) Op. cit. 269. Wren, C. H. Report on genesis and present status of the artichoke thistle problem in Solano County. Op. cit. 269-272. Harris, M. R., and G. L. Stout. Weeds as a factor in the spread of plant diseases in California. Op. cit. 273-277. Lockwood, S. The relation of weeds to insect pests. Op. cit. 279-282. Bunting, Leatha. Noxious weed seeds found in crop seeds. Op. cit. 283-285. Bellue, Margaret K., and W. S. Ball. Hoary cress (*Lepidium Draba* L.) Op. cit. 287. Bellue, Margaret K. New weeds confused with hoary cress. Op. cit. 288-293. Ball, W. S., W. W. Robbins, and Margaret K. Bellue. The star thistles (*Centaurea* spp.) Op. cit. 294-298. Goodwin, P. M. Weed control by means of soil sterilization. Op. cit. 299-301. Goss, W. L. Buried seed experiment. Op. cit. 302-304. Ryan, H. J. Progress of pest eradication in California. Op. cit. 306-313.

¹⁶ Bellue, Margaret K. Austrian field cress—new and noxious. Op. cit. 22: 385-386. 1933.—*Carduus neglectus* Ten. Italian thistle. Op. cit. 23: 195. 1934.

¹⁷ Ball, W. S., and Margaret K. Bellue. Nut grasses. Op. cit. 23: 182-184. 1934.

and *C. rotundus* L., the species of this genus which are most troublesome as weeds.

Her article¹⁸ on the weeds whose seeds are found in seed rice came to my attention ten years after my experience in rice growing ended; the following comments are offered with diffidence. The distribution of weeds in seed rice does not perfectly reflect their distribution in the field. Common cat-tail is among the most serious of rice-field weeds; its seeds are found, however, in only 6% of the samples tested, and, when present, they are not exceedingly numerous. This is to be expected from the fact that cat-tail is disseminated by wind. Aside from cat-tail, the weeds formerly most dreaded were water grass (*Echinochloa*; several races which the best authorities refuse to name except as *E. Crus-galli* Beauv.) and wire grass (*Eleocharis palustris* R. Br.). Of these *Echinochloa* is duly reported as found in 81% of the samples and represented by more seeds per pound than any other weed except *Ammania*; *Eleocharis* is represented in only 4% of the samples, and by but few seeds. *Alisma Plantago-aquatica* L., *Echinodorus cordifolius* Griseb., and *Ammania coccinea* Rottb. may not be as troublesome in the field as the abundance of their seed would suggest. By law, all species of *Cyperus* seem to be "noxious weeds." *Cyperus esculentus* L. and *C. rotundus* L., the species which seem to have won the genus its reputation, are not among the species common in rice fields. The three common species of rice fields have been determined respectively, as *C. virens* Michx. (otherwise *C. vegetus* Willd.; *C. serrulatus* S. Wats.), a perennial, abundant only on dikes; *C. diandrus* Torr. (or *C. melanostachys* H. B. K.), an annual sometimes abundant in the shade of the rice; and *C. erythrorhizos* Muhl., an annual, growing taller than the rice in the open paddy. Of these, only the last is apparently likely to make trouble; and it has not proved troublesome in practice. The same may be said of *Leptochloa fascicularis* (Lam.) Gray. A few occurrences of *Centaurea solstitialis* L. and *Holcus halepensis* L.—legally noxious weeds—are reported. These will do the rice grower no harm. In general, the lists of weeds reported in less than 5% of the samples are of plants common everywhere, nowhere troublesome in cultivated fields, and least troublesome of all in rice. An undetermined species of *Scirpus* is said to have become abundant since 1926. This report seems ominous. Earlier freedom from *Scirpus* may have depended on dissemination less efficient than that of *Typha*. A growing abundance of red rice is also ominous. Redness in rice is not to be considered the mark of one race; it is a genetic character which can be combined with many others. The essential objection to it is aes-

¹⁸Bellue, Margaret K. Weeds of California seed rice. Op. cit. 21: 290-296. 1932.

thetic; customers do not want it. There is also apparently some tendency for red races to tiller poorly, to produce small heads, and to shatter; in short, to be poor yielders. I suspect a tendency to fruit early; this may explain the absence of red rice in the old *wataribuni* and its presence in the subsequently developed earlier varieties. Eradication will not be easy. It is not always possible to recognize and pull by hand individual plants which will produce red seed; and manipulation of water level, by which many weeds can be placed at a disadvantage, cannot be expected to damage one race of rice more than another.

All this work on weeds may lead to the publication of a new weed book for California. The old one, Smiley's useful work,¹⁹ was published as a number of this same Monthly Bulletin. This review of botanical papers in recent volumes of the Monthly Bulletin would be incomplete without reference to the report of Goss and Bunting²⁰ on the viability of flower seeds.

In addition to the Monthly Bulletin, the Department issues a numbered series of special publications. Subjects of temporary or limited interest are handled in this series, of which the latest (as of November, 1934; No. 129) is a directory of nurserymen and florists in California. Formerly, when the Board of Agriculture had administrative responsibilities, it issued an annual statistical report on the agriculture of the State. The last of this series, a volume of more than five hundred pages of text, appeared in 1921. It was a most useful work of reference, including material for which one must now search in many places; but preparation was expensive and perhaps not justified by the demand.

In the preparation of this account, I have had the assistance of members of the Department, and especially of Mr. W. C. Jacobsen, Administrative Assistant and Supervisor of Rodent and Weed Control. It is a pleasure to express cordial appreciation of this assistance. The facts stated, however, are based on my own reading, and the opinions are my own: the responsibility is entirely mine.

Sacramento Junior College,
December, 1934.