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Weather Modification Legislation -- A Survey

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WEATHER MODIFICATION LEGISLATION—A SURVEY

Mark Twain's oft-quoted assertion that "Everybody talks about the weather, but nobody does anything about it" was first disputed by reputable scientists during the mid-forties, when General Electric Corporation, in conjunction with the Armed Forces, began serious attempts at weather modification by "seeding" cumulus cloud formations with solidified carbon dioxide or "dry ice."[1] Now, after a decade of experimentation, scientists still cannot agree on the effectiveness of major weather modification attempts.[2] However, it is generally conceded that under certain atmospheric conditions, precipitation can be artificially induced with a relatively high degree of success and accuracy in a given local area,[3] and this fact has given rise to a recent growth of the surprisingly ancient trade of "rainmaking."[4] Thus, in the summer of 1951, western ranchers and farmers spent more than $3,000,000 with rainmaking companies in order to increase precipitation on some 350,000,000 acres, and the majority of the subscribers thought they had received their money's worth.[5]

That such large-scale activities directly affecting so many people should become the subject of governmental regulation is not particularly surprising, especially in the arid and semi-arid western states, where water is a scarce and precious resource. Thus far, eleven states have enacted statutes dealing with weather modification and control,[6] and at least one other is contemplating legislation of this sort.[7] In

1. Schaefer, *Production of Ice Crystals in a Cloud of Supercooled Water Droplets,* 104 SCIENCE 457 (1946). See also Ball, *Shaping the Law of Weather Control,* 58 YALE L. J. 213 nn. 13 and 16 (1949).

2. Compare the statements of Dr. Irving Langmuir reported in the N.Y. Times of April 29, 1955, p. 23, col. 1, to the effect that weather control experiments changed the course of a hurricane, with those by Dr. Jerome Spar indicating that cloud seeding can have no large scale results, reported in the same source, on April 16, 1955, p. 1, col. 1, and again on April 17, 1955, sec. IV, p. 11, col. 6.

3. Schaefer, *Localized Effects Induced by Seeding Supercooled Clouds with Dry Ice and Silver Iodide,* 112 SCIENCE 455 (1950); N.Y. Times, April 17, 1955, sec. IV, p. 11, col. 6.

4. See, for example, Frazer, *The Golden Bough,* C.V. (abr. ed. 1937), cited in 58 YALE L. J. 213 n. 1 (1949); and *Weather Making, Ancient and Modern* SMITHSONIAN REPORT 1894 (1896), cited in 1 STAN. L. REV. 43 (1948).

5. 97 CONG. REC. A5375 (1951), reporting an article in FARM JOURNAL for September, 1951, by Paul Friggens.

6. Arizona, California, Colorado, Massachusetts, Nevada, New Hampshire, South Dakota, Utah, Wisconsin, and Wyoming. The New Hampshire act, N. H. Laws 1953, c. 137, merely authorizes state agencies to cooperate with experimenters and to participate in experiments. It is not, therefore, within the scope of this work. Citations to the other statutes are given as each statute is considered.

7. The 1955 session of the Tennessee Legislature requested its Legislative Council to investigate the subject of weather modification legislation and report to the 1957 session on its conclusions. It was at the suggestion of Mr. Thomas A. Johnson, Executive Director of the Legislative Council, that this note was written.

addition, weather control legislation which would have made the field an exclusively federal domain was introduced in Congress in 1951 and again in 1952, but both bills died in committee.[8]

The present state statutes seem to group themselves into two categories: those aimed at actively controlling rainmaking and rainmakers, with the collection and evaluation of scientific information an important adjunct of control; and those aimed solely at the collection and evaluation of information. The former group includes Arizona, California, Colorado, Massachusetts, Oregon, South Dakota, and Wyoming. Nevada, Utah and Wisconsin compose the minority.

The laws of the minority are relatively uncomplicated and uniform. Nevada requires only that notice be given to the state engineer,[9] who may establish "reasonable rules and regulations" regarding reports.[10] Utah also requires mere notice to be given, but to the head of the Department of Meteorology, University of Utah, who is entitled to such reports as he deems necessary.[11] Wisconsin requires registration as to operator, time, place, and method of operation, with its Public Service Commission,[12] together with reports of such scientific information as the Commission deems necessary.[13] Thus, anyone apparently can conduct weather modification operations so long as the state is notified. The permission of the state is seemingly not necessary. As has been noted, these laws are aimed only at the collection of information. They do not seek to control operations or to protect specifically any private rights, but failure to supply the information required is uniformly a misdemeanor,[14] and Wisconsin subjects unauthorized operations to abatement as a public nuisance.[15]

The majority of the laws are more restrictive, however, requiring application for and obtaining of a license—as distinguished from mere notification—by anyone seeking to undertake weather modification operations.[16] The license issues only after payment of the inevitable fee, except in Massachusetts,[17] and has a variable life.[18] As in the

8. The Weather Control Act of 1951, S.4236, was introduced by Sen. Anderson of New Mexico on December 8, 1950. 96 CONG. REC. 16317 (1950). It was re-introduced on January 8, 1951, as S.222. 97 CONG. REC. 89 (1951). No action was taken on either bill after reference to committee.

9. Laws of Nev. 1953, c. 113, § 1.

10. *Id.*, § 2.

11. UTAH CODE ANN. § 73-15-1 (Supp. 1955).

12. WIS. STAT. § 195.40 (2) (1953).

13. *Id.*, § 195.40 (3), (4).

14. Laws of Nev. 1953, c. 113, § 3; UTAH CODE ANN. § 73-15-1 (Supp. 1955); WIS. STAT. § 195.40 (5) (1953).

15. WIS. STAT. § 195.40 (5) (1953).

16. ARIZ. CODE ANN. § 75-2401 (Cum. Supp. 1951); CAL. WATER CODE § 402 (1954); COLO. STAT. ANN. c. 174A, § 7 (Cum. Supp. 1953); MASS. ANN. LAWS c. 6, § 72 (1952); ORE. REV. STAT. § 558.030 (1953); Sess. Laws of S.D. 1953, c. 321, § 5 (1); WYO. COMP. STAT. ANN. § 71-2804 (Cum. Supp. 1953).

17. Arizona—$100, § 75-2403; California—to be fixed by the Department of Public Works, but no more than $50, § 403; Colorado—$100, § 10; Oregon—$100, § 558.040; South Dakota—$100, § 6 (2); Wyoming—$25, § 71-2806. (All section references are to the sources listed in note 16, *supra*).

minority states, failure to comply with the act is uniformly a misdemeanor.[19] All of the majority acts provide that some record of the experiments be made and filed with the controlling agency,[20] and all provide for revocation of the license for cause.[21] However, only five states provide for administrative procedures to determine the revocation issue.[22] Aside from these similarities, the acts are far from uniform, and rather than attempt to force identities that do not exist, it would perhaps be more profitable to sketch briefly the noteworthy features of each act.

Arizona—Arizona is unique in controlling not only weather modification operations, but also the manufacture and sale of weather modification equipment.[23] And owners, lessees, or licensees of land used for agricultural purposes, attempting weather modification on their own land for their own benefit, are exempt from the provisions of the act,[24] as are state and federal agencies.[25] Like several other states, however, Arizona requires that the application for the permit contain the names of all the parties interested in the operation, as well as certain scientific information to aid in evaluation.[26]

California—The application for the license must set forth the name of the applicant, certain scientific information, and such other pertinent information as the issuing department may require.[27] A notice of intent concerning operations must be published in the area to be affected,[28] but there is apparently no way of protesting or preventing scheduled operations. Emergency operations to extinguish fires may be approved by the department, even though the statutory requirements for a license have not been fulfilled.[29]

18. Arizona makes no provision for the expiration of the license; California—one calendar year, § 405; Colorado—calendar year in which issued, § 10; Massachusetts—limited as to time and place by issuing authority, § 72; Oregon—one calendar year, § 558.060; South Dakota—calendar year in which issued, § 5 (2); Wyoming—permits are required for each operation, § 71-2805, and a registration certificate is required for each calendar year, § 71-2806. (All section references are to the sources listed in note 16, *supra*).

19. Arizona, § 75-2406; California, § 415; Colorado, § 14; Massachusetts, § 72; Oregon, § 558.990; South Dakota, § 8; Wyoming, § 71-2810. (All section references are to the sources listed in note 16, *supra*).

20. Arizona, § 75-2404; California, § 411; Colorado, § 9; Massachusetts, § 72; Oregon, § 558.110; South Dakota, § 4 (4) and (2); Wyoming, § 71-2807. (All section references are to the sources listed in note 16, *supra*).

21. Arizona, §§ 75-2404, 75-2405; California, § 414; Colorado, § 11; Oregon, § 558.130; South Dakota, § 5 (2); Wyoming, § 71-2805. The Massachusetts license, issuing for a short time and a limited area, would not need to be revoked. (All section references are to the sources listed in note 16, *supra*).

22. California, § 414; Colorado, §§ 11, 12; Oregon, § 558.130; South Dakota, § 5(2); Wyoming, § 71-2805. (All section references are to the sources listed in note 16, *supra*.)

23. ARIZ. CODE ANN. § 75-2405 (Cum. Supp. 1951).

24. *Id.*, § 75-2407.

25. *Id.*, § 75-2401.

26. *Id.*, § 75-2403.

27. CAL. WATER CODE § 404 (1954).

28. *Id.*, §§ 407-409.

29. *Id.*, § 413.

Colorado—The Colorado act asserts the state's right to all the moisture in the atmosphere over the state,[30] following the Colorado rule on flowing water.[31] A Weather Control Commission is established to promulgate rules, regulations, and practices,[32] but the offices of the state engineer and the commissioner of agriculture are charged with the administration of the law.[33] Colorado safeguards its citizens by requiring that prospective licensees demonstrate skill and experience in weather control as well as financial responsibility.[34] And there is a sort of negative reciprocity clause, prohibiting Colorado-based operations for the benefit of those states which refuse to permit operations for the benefit of Colorado.[35]

Massachusetts—The Massachusetts law, after establishing a Weather Amendment Board, declares weather alteration to be a public function. But preventing frost damage is not weather alteration within the scope of this act. A public hearing is a condition precedent to the issuance of a certificate of authority, and the records of the board are open to the public.[36]

Oregon—The parties interested in the experiment must be named in the application for permit in Oregon, together with certain scientific data, and such other pertinent information as the Director of Agriculture—the issuing authority—may require.[37] Proof of the rainmaker's financial responsibility in the amount of $100,000 for personal injuries,[38] and a like sum for property damages, is a prerequisite to the issuance of the license.[39] A notice of intent concerning operations must be filed, followed, and published in the affected areas in advance.[40] But as in California,[41] emergency operations to combat fire, fog, or other extreme situations may be allowed without formal compliance with the statute.[42]

South Dakota—The South Dakota statute governing weather modification activities is the broadest of the lot, covering specifically *all* experimentation and research and development, including models.[43]

30. COLO. STAT. ANN. c. 174A, § 1 (Cum. Supp. 1953).
31. COLO. CONST. ART. XVI, § 5: "The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided."
32. COLO. STAT. ANN. c. 174A, § 3 (Cum. Supp. 1953).
33. *Id.*, § 6.
34. *Id.*, § 8.
35. *Id.*, § 13.
36. MASS. ANN. LAWS c. 6, § 72 (1952).
37. ORE. REV. STAT. § 558.040 (1953).
38. However, liability is limited to $50,000 per person. *Id.*, § 558.050.
39. *Ibid.*
40. *Id.*, §§ 558.070-558.090.
41. *Supra*, note 29.
42. ORE. REV. STAT. § 558.120 (1953).
43. Sess. Laws of S.D. 1953, c. 321, § 2(2).

The state is proclaimed the owner of all the air-borne moisture within its borders,[44] and the term "weather modification" is defined in broadest terms, to include changes in temperature and wind direction and velocity, as well as control of precipitation and fog.[45] A Weather Control Commission which is established by the legislation, acts in an advisory capacity to the Department of Agriculture;[46] that Department is charged with the enforcement and administration of the act.[47] The Commission must evaluate the various operations within the state,[48] a function generally delegated to the experimenter by other statutes.[49] The fees from the license applications are to go into a Weather Modification Revolving Fund, which is a permanent, non-reverting fund to finance weather modification operations.[50] Cooperation with the federal and other state governments is specifically authorized.[51]

At the 1955 session of the Legislature, South Dakota provided for the establishment of a "weather modication" fund by each county of the state. The fund, to be established upon petition of fifty-one percent of the freeholders in the county, is raised by a special tax and can be used only for gathering information, and aiding or conducting a weather modification program.[52]

Wyoming—Wyoming, like Colorado[53] and South Dakota[54] asserts its ownership of the moisture in its air.[55] A weather modification board is established,[56] which is primarily an evaluation board,[57] but permits from the state engineer are to issue only upon the recommendation of the board.[58] Separate permits, in addition to the annual registration certificate, are required for each experiment.[59] The act specifically denies that any additional liability accrues to the state or that individual legal rights are affected by the law.[60]

All of the present statutes provide for the collection and evaluation of scientific information,[61] but it is noteworthy that few even make reference to such rights of the average citizen as may be affected by weather modification.[62] And yet in the future, this subject will be

44. *Id.*, § 1(1).
45. *Id.*, § 2(1).
46. *Id.*, § 4.
47. *Id.*, § 3.
48. *Id.*, § 4(4) (2).
49. *Supra*, note 20.
50. Sess. Laws of S.D. 1953, c. 321, § 6 (4).
51. *Id.*, § 7.
52. Sess. Laws of S.D. 1955, c. 264.
53. *Supra*, note 32.
54. *Supra*, note 44.
55. WYO. COMP. STAT. ANN. § 71-2801 (Cum. Supp. 1953).
56. *Id.*, § 71-2802.
57. *Id.*, § 71-2803.
58. *Id.*, § 71-2804.
59. *Id.*, § 71-2805.
60. *Id.*, § 71-2809.
61. *Supra*, notes 10, 11, 13, and 20.
62. These include Nevada (§ 4), Colorado (§ 8), Oregon (§ 558.050),

at least as important as will be the technical developments that experience and experiment will produce.

The writers in the legal periodicals have thoroughly and adequately discussed the questions that weather modification could evoke in the courts,[63] and further speculation would be superfluous. But it would seem advisable for legislators to consider certain of these problems in writing future weather modification legislation.

First, a property owner ought to be protected from undesired weather made to order by his neighbor. Although *A* might need rain on his winter wheat, *B* ought not to be forced to have his hay ruined or his resort made less attractive[64] by this same rain. Hence, *A* should be required to give advance notice of intended operations to those within the affected area and should be expressly subject to injunction upon a showing that the proposed operation would substantially infringe upon the rights of others. Further, the state should ensure *B* that, where *A*—or his hired professional rainmaker—for any reason damages *B*, *B* can recover if he can win a judgment in court.[65] This would mean that a person contemplating weather modification would have the possibility of loss as well as the possibility of gain, and would put a check on irresponsible operators. And if the government is the rainmaker, or the buyer of the services, it should be equally subject to suit and injunction. Its solvency, of course, presents no problem.

It might be argued that such provisions would serve to encourage lawsuits and fraudulent claims. But there are three answers: First, this contingency ought not to be a shield for incompetent or financially irresponsible rainmakers. If the rainmaker is to have the benefit of his efforts, he should also have the burden of preventing harm to others. Second, by giving advance notice to the areas to be affected by the proposed operations, he would be protected against those claims for damage that might occur from a failure to protect property adequately against unseasonal weather. Such notice is presently required

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Wyoming (§ 71-2809), and possibly Massachusetts, which declares weather modification to be a public function (§ 72). (All section references are to the sources listed *supra* in notes 9 and 16).

63. Ball, *Shaping the Law of Weather Control*, 58 YALE L.J. 213 (1949); Note, *Legal Problems Raised by Artificial Rainmaking*, 4 VAND. L. REV. 332 (1951); Comment, *Legal Clouds for Rainmakers*, 14 ALBANY L. REV. 204 (1950); Comment, *The Legal Aspects of Rainmaking*, 37 CALIF. L. REV. 114 (1949); Comment, *Rainmakers and Legislation*, 1 CATHOLIC L. REV. 122 (1951); Note, *Rainmaking and the Law*, 29 CHI-KENT REV. 150 (1951); Note, *Rain and the Law*, 39 GEO. L.J. 466 (1951); Comment, *Rights of Private Land Owners as Against Artificial Rain Makers*, 34 MARQ. L. REV. 262 (1951); Note, *Who Owns the Clouds?* 1 STAN. L. REV. 43 (1948); Note, *Artificial Rainmaking*, 1 STAN. L. REV. 508 (1949).

64. This was the issue in *Slutsky v. City of New York*, 197 Misc. 730, 97 N.Y.S.2d 238 (Sup. Ct. 1950), the only reported case thus far involving rainmaking.

65. See Oregon's provision, *supra*, note 39.

by three states.[66] The remaining fraudulent claims would be subject to a burden-of-proof hazard, either developed by the courts as the cases arise, or specifically defined by the legislature.

Secondly, both citizens desiring to employ rainmakers and those desiring to suppress such activities ought to be protected from unqualified and irresponsible experimenters.[67] The applicant for a license should be required to produce creditable evidence of proficiency in his trade, but Colorado is alone at present in requiring such evidence.[68]

There is a third, more specialized, group of rights of private citizens that should be considered by legislatures concerned with weather modification. As one writer has phrased it, "Who Owns the Clouds?"[69] Regardless of whether rainmaking increases total rainfall or merely redistributes it, attempts will probably be made to extend traditional common-law rules regarding surface, ground, and riparian water to air-borne moisture.[70] Thus, a land-owner in a semi-arid area, whose land formerly had received sufficient precipitation to support agriculture could conceivably have a cause of action against a rainmaker whose efforts deprived the land of its accustomed moisture. And there have been suggestions that air-borne waters might be treated as *ferae naturae*.[71] In the face of this confusion and uncertainty, any statute concerned with weather modification should include some definition of the rules to govern the appropriation and ownership of air-borne moisture.

To recapitulate, weather modification legislation should provide for: 1) the collection and evaluation of scientific data; 2) the protection of the general public from capricious and irresponsible modification activities; 3) the protection of the public from unscrupulous professional rainmakers; and 4) rules to govern the appropriation and ownership of air-borne moisture. Of all of the statutes thus far enacted, those of Colorado and Oregon seem to be the most adequate. Neither specifically protects the citizen from undesired operations, but perhaps the state courts would not feel the need of a permissive statute in order to enjoin patently undesirable activities.[72] Both of the

66. California, *supra*, note 28; Oregon, *supra*, note 40; and Massachusetts. Actually, Massachusetts requires hearings in the affected area before the license is issued, *supra*, note 36.

67. For an interesting account of an earlier, "too-successful" rainmaking experiment, see the reference in 1 STAN. L. REV. 43, 43-44 (1948) to San Diego's troubles in 1916, originally set forth in the San Diego Union, June 9, 1948, § 2, p. 1. col. 4.

68. *Supra*, note 34.

69. 1 STAN. L. REV. 43 (1948).

70. These are the most common analogies used by writers in legal periodicals. See citations in note 63, *supra*.

71. Note, *Rain and the Law*, 39 GEO. L.J. 466, 473 (1951); Note, *Who Owns the Clouds?*, 1 STAN. L. REV. 43, 49 (1948).

72. See the opinion of Pecora, J. in the *Slutsky* case, *supra*, note 64. There is no language to indicate that the traditionally broad jurisdiction of equity could not encompass this somewhat novel fact situation.

statutes have provisions requiring weather modifiers to demonstrate financial responsibility,[73] but Colorado does not require advance notice concerning operations. As is noted above, Colorado is by itself in requiring proof of technical competence,[74] however, and Oregon lacks the definition of ownership of air-borne moisture that is found in the statutes of Colorado, South Dakota, and Wyoming.[75] With these additions either statute might serve as a model for other states writing legislation of this sort. But because of the particularly transient nature of the subject matter, comprehensive federal legislation must be the ultimate governor of these legal problem children of science.

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73. *Supra,* notes 34 and 39.
74. *Supra,* note 68.
75. *Supra,* notes 30, 44, and 55.