EDITOR'S NOTE: The searing public issue in the Northwest of field burning hangs over the seed-production and sod-growing industries like a guillotine, ready to cleave off a major share of the profits of many growers or completely kill the business of countless others. The roar of air pollution from the cities causes rumbles constantly in the State House. The question is whether the outcry will get results before researchers get answers. Research for economically feasible alternatives is frantic. Following is a condensation of field burning research from Oregon State University, as reported in the winter edition of the University's "Oregon's Agricultural Progress."

FIELD BURNING

GRASS SEED INDUSTRY TEETERS ON ISSUE OF

FIELD BURNING, a Linn County grass seed grower remarked recently, "is by far our industry's most essential cultural practice. Without it, grass seed production in the Willamette Valley simply wouldn't be feasible."

There is much evidence in support of this view. For field burning effectively controls blind-seed, ergot, grass seed nematode, and numerous other crippling diseases. It also checks weeds, rodents, and certain insects, contributes greatly to yield maintenance, and economically disposes of post-harvest straw and stubble.

Unfortunately, these are not the only effects of the practice. Under certain conditions, smoke from burning fields causes considerable visibility loss and occasionally serious traffic tie-ups. Field burning also injects into the atmosphere gaseous pollutants and contaminant particles that often soil and otherwise damage personal property. And it may affect human health. As a result, use of the practice has become one of Oregon's more significant public issues.

First Used in 1940s

Back in the mid-1940s, when field burning was first used on Willamette Valley perennial grass seed fields, less than 50,000 acres were involved. The practice proved sufficiently beneficial, however, that by 1968, it was being used on an estimated 315,000 acres: 140,000 acres of perennial grass seed crops, 90,000 acres of annual ryegrass, and 85,000 acres of small grains. And the volume of straw and stubble residues being burned was estimated to exceed 700,000 tons.

The field burning season generally lasts about two months, beginning around Aug. 1 and continuing through Sept. 30. Normally, this is a period of fine weather in the Willamette Valley. But it also is a period during which the airmass above the valley becomes increasingly stagnant and poorly ventilated. As summer progresses, therefore, the capacity of this airmass to accept, dilute, and disperse all of the emissions produced by burning is increasingly likely to be overpowered. When it is overpowered, of course, the result is greatly intensified levels of local air pollution.

In recognition of this increasingly serious problem, OSU scientists are conducting intensive research in many areas related to field burning. This effort, reports R. M. Alexander, assistant director of the Agricultural Experiment Station, is aimed both at finding ways to alleviate the harmful effects of field burning and at finding alternatives leading to reduced use or elimination of the practice. Among the significant general findings to date:

- The excellent field sanitation which burning provides is of prime importance for most perennial grass seed crops. As yet, no satisfactory alternative way has been found to control the major diseases of perennials.
- Burning of some perennial grass seed crops on an every-other-year basis may be possible without drastic yield reductions. In addition, two relatively smoke-free residue disposal devices now being developed — a propane flamer and a mobile incinerator — may prove capable of replacing at least a portion of the open burning in perennials. Both

devices involve higher production costs, however, and one — the propane flamer — most likely involves increased incidence of disease.

Helps Reduce Costs

● Burning of annual crops—annual ryegrass and cereal grains—is an advantageous practice primarily because it helps reduce production costs. Disease control is not as necessary a consideration as it is with perennials. These annual crops account for an estimated 55% of the acreage and two-thirds of the residue tonnage now being burned. A few varieties of annual ryegrass are vulnerable to diseases presently controlled through field burning. Too, a satisfactory alternative way has not yet been found to control weeds in annual ryegrass.

● Straw removal by some means is vital for both perennial and annual crops. With perennials, removal appears essential for successful production of all species. With annuals, the most feasible alternatives to removal by burning are soil incorporation and mechanical removal. Large residue tonnages and the heavy, wet-type soils commonly used to produce annual ryegrass make satisfactory incorporation very difficult to achieve with this crop. Mechanical removal, of course, requires that uses be found for straw residues, since they otherwise would become a solid-waste pollutant.

● Straw residues can be used to make various industrial products, such as plastics and pulp for paper, although there are technical and economic hurdles involved. A recently developed microbial process could facilitate many utilization possibilities. The most promising and immediately available use for straw residues, however, appears to be a livestock feed.

● It may be possible to grow crops that do not require burning on at least a portion of the lands now devoted to grass seed production, though a very considerable investment, as well as developments of markets, would be required.

Engineer R. W. Boubel, crop physiologist D. O. Chilcote, and E. M. Bates, U.S. Weather Bureau agricultural meteorologist stationed at OSU, are evaluating the many meteorological and agronomic variables involved in field burning. It is hoped these variables can be combined into a series of mathematical models which, when computerized, will enable more rapid and precise prediction than now possible of when, where, and how much growers should burn on a given day. Also engaged in this effort are atmospheric scientists E. W. Hewson, L. E. Olsson, and W. P. Lowry.

Mobile Incinerator

A mobile incinerator, now being developed by agricultural engineers R. W. Bonlie and G. E. Page, appears a promising alternative to open burning and also may posses some advantages over propane flaming. For with this unit, which Chilcote and the engineers will test this coming summer, the flame can be kept under control. Better combustion and, thus, reduced smoke and particulate output should be achieved. Good field sanitation also should be accomplished, since residues are burned right on the ground. Projected capacity of the incinerator is from two to five acres per hour. Such a unit, though, probably would be quite costly — perhaps from $15,000 to $25,000.

J. R. Hardison, U.S. Department of Agriculture plant pathologist stationed at OSU, is testing a wide variety of chemicals in hopes of finding some materials that will check the major diseases so effectively controlled by burning. He has found that soil applications of an experimental systemic fungicide will provide direct chemical control of ergot and blind-seed. The material would be expensive, however, and large dosages would be required.

In search of satisfactory herbicides and other methods of weed control — particularly in annual ryegrass — are W. O. Lee, U.S. Department of Agriculture agronomist stationed at OSU, Chilcote, and agronomist A. P. Appleby. The most promising herbicide found to date for controlling weeds in annual ryegrass at the time of establishment is a compound known as paraquat. However, this material is quite costly and also can be toxic to humans.

W. J. Bublitz, pulp and paper chemist, has learned that a pulp satisfactory for manufacture into certain grades of paper can be produced from annual ryegrass straw. Yield on a dry basis is about one-half ton of pulp per ton of straw — the same yield as obtained from wood. The paper is superior to that made from Douglas-fir pulp in folding, tensile, and bursting strength. More-

(Continued on Page 46)

Oregonian 'Seeding' Each State's Tallest Mountain

Mitch Michaud, a mountain man from Portland, Ore., has set upon an odyssey that would tickle the fancy of the Greek poet Homer.

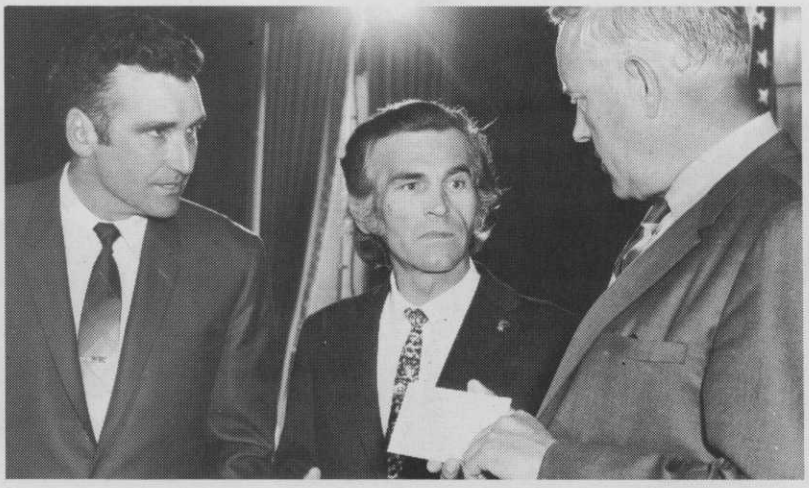
Michaud is shaping a voyage through the U.S. on a trail never before taken by man in a single year. His goal . . . to climb the highest peak in every state during 1970.

A mountain guide by trade, the 40-year-old Michaud has climbed the taller mountains of the United States and Europe and now hopes to be the first man to conquer such peaks as Jerimoth Hill in Rhode Island (elevation 812 feet) along with Mt. McKinley in Alaska (elevation 20,320 feet) in one calendar year. Why?

Michaud explains the high mountains are the last of the pioneer areas where a challenge still exists for man to use his best judgment and knowledge of nature to succeed. It is exhilarating to reach the summit of the high peaks, he explained, where fresh air, bright sunshine and a clean environment abounds.

To assure the maintenance of the mountain ecology, Michaud plans to plant a handful of Oregon grown grass seed along the mountainside. It's a small gesture, Michaud admits, but it is emblematic of the value of grass in our environment. He will also pass out small packets of Oregon grass seed to wellwishers along the route. The packages explain the story of Oregon grass seed by pointedly stating Oregon is the Grass Seed Capital of the World with more than 405 square miles of grass seed production.

Michaud has already acquired the nickname, "Johnny Grass Seed," since the Oregon Seed Council provided him with several thousand packages of seed to distribute along his route.



Oregon Governor Tom McCall, right, visits with Mitch Michaud, center, and Bill Rose, seed grower, about the importance of grass to the nation's ecology. Michaud will distribute the grass seed across the nation during his endeavor to climb the highest peak in each state during 1970.

Armed with a letter from Oregon's Governor Tom McCall, who has named Michaud official goodwill ambassador for the state, the mountain climber will make personal calls on the governor of each state, where he will offer them suitable varieties of Oregon's famous grass seed for use in any of their state parks.

Some of the "peaks" he will climb aren't really mountains at all. The highest point in Florida is a 345-foot hump in the highway. In Ohio, the 1,550-foot summit is located on a spot housing a radar station and Michaud must have security clearance for the climb. Scaling the highest point in Illinois will cost Michaud one dollar since the site is located on a farmer's land who charges hikers to enter his property. Michaud was to begin his trek Apr. 6, scaling Moana Kea in Hawaii for the longest climb on his itinerary. The 13,796-foot mountain begins at the ocean's edge. His remaining announced schedule follows:

May 10	Idaho, Mt. Borah 12,662
May 16	California, Mt. Whitney 14,495
May 23	Washington, Mt. Rainier 14,410
June 1	Alaska, Mt. McKinley 20,320
July 4	New Mexico, Wheeler Park 13,160
July 11	Colorado, Mt. Elbert 14,431
July 25	Wyoming, Garnet Peak 13,785
Aug. 1	Montana, Granite Peak 12,799
Aug. 8	New Jersey, High Point 1,803
Aug. 12	Connecticut, Mt. Frissell 2,380
Aug. 15	Massachusetts, Mt. Greylock 3,491
Aug. 17	Rhode Island, Jerimoth Hill 812
Aug. 22	Maine, Mt. Katahdin 5,268
Aug. 26	New Hampshire, Mt. Washington 6,288
Aug. 30	Vermont, Mt. Mansfield 4,393
Sept. 2	New York, Mt. Marcy 5,344

Field Burning . . .

(Continued from Page 41)

over, straw residues are best adapted to the soda pulping process which is virtually odorless. The paper is quite low in tear strength, however.

Agricultural chemist V. H. Freed and other workers at the OSU Environmental Health Sciences Center have found that various industrial raw materials can be extracted from straw residues. Among them are lignin, pentosans, waxes, and in particular, cellulose, which can be used to make a wide range of acetate plastics. Straw also can be used to make such products as a high density construction board and an organic soil amendment.

A new process developed by microbiologist D. A. Klein and his associates could solve many of the problems involved in both utilization and disposal of straw residues. For it makes possible rapid and controlled microbial breakdown of straw, as well as other lignin-containing materials. The process, called photofermentation, essentially consists of exposing the straw first to intense light energy, then to selected types of fungi or bacteria.

Perhaps the most promising potential use of straw residues found to date is as a feed for livestock. In feeding tests conducted by animal scientist A. T. Ralston with replacement heifer calves, ryegrass pellets supplemented with molasses, urea, and barley have produced average daily gains of 1.74 pounds at a cost of 13.3 cents per pound. And pellets containing equal amounts of wheat chaff and alfalfa also have produced average daily gains of 1.74 pounds on steer calves.