new hall will provide a center of activity for its now scattered students. It will be known as Fuld Hall, in honor of Felix Fuld, whose wife was one of the original founders of the institute. Construction will begin immediately and it is hoped that it will be ready for occupancy by the middle of September, 1939. The hall, which will be erected at the cost of $500,000, will be constructed of colonial and Georgian brick. It will be approximately 250 feet in length, and will be situated on the Olden farm, a tract of about 450 acres adjoining the Graduate College of Princeton University. There will be studies for members of the professorial staff and students, in addition to seminar rooms, a library, a commons and a lounging room.

THE cornerstone for the new building of the New York Medical College, Flower and Fifth Avenue Hospitals was laid on October 20. This date is the fiftieth anniversary of the laying of the cornerstone of the old buildings at 64th Street and is eighty years since the founding of the institution by William Cullen Bryant. The new building is located between 105th and 106th Streets on Fifth Avenue. It is expected to be completed for occupancy by June, 1939. A special program given in the afternoon included speeches by Dr. George W. Crile and Mayor Fiorello H. La Guardia. The new building will house all the departments of the college as well as the out-patient department of the hospitals.

A DIVISION OF AGRICULTURAL AND INDUSTRIAL MARKETING was recently set up by the Oregon State Board of Higher Education, its purpose being "to increase the wealth and income of the people of Oregon by encouraging the use of scientific methods in marketing Oregon products." A committee has been appointed by the board to advise with the director of the new division on all important matters of policy and procedure. The term of service of members will be nine years, one member to be appointed each year. The nomination of a director will be made by a committee consisting of Dr. Frederick M. Hunter, chancellor of the Oregon State System of Higher Education, President Donald M. Erb, of the University of Oregon, and President George W. Peavy, of the Oregon State College.

DISCUSSION

NUCLEAR CONTROL OF CELL ACTIVITY

THE changes that take place during development resulting from the loss or shift of chromosomes or chromosome segments have a direct bearing on the control of growth. Stern has pointed out recently[1] that single cell mosaics indicate a regulation of characters expressed in the cytoplasm by the nucleus, evidently by means of diffusible substances that pass through the nuclear membrane, since there is no subsequent cell division and consequently no disappearance of the nuclear membrane.

In maize seeds single cell mosaics exhibit changes in color, in starch formation and in size and shape of cells. Color in the aleurone cell is expressed in pigmented granules in the cytoplasm. The nucleus is colorless. Starch is likewise laid down in the cytoplasm and may vary from the normal blue-staining starch to the red-staining erythrodextrin, to the brown-staining sugary condition or to colorless. Changes in size of aleurone cells range from twice the diameter of normal cells up to ten times normal size or even more. Shape also varies widely from the normal spherical condition.

All these changes occur in single cells which appear alone or paired with other cells showing different alterations from normal. The effect of lethal conditions is also manifested in single cells. Lindegren and Scott[2] illustrate an ascus in Neurospora with four of the eight ascospores aborted. These aborted and normal cells are arranged in such an order that the lethal action did not stop cell division until the second equational division had taken place. This is an apparent exception to the direct action of diffusible substances, since the lethal effect was delayed until after one cell division.

The evidence derived from genetic and cytological observations shows that changes originate in aberrant chromosome behavior. The exact nature of this aberration is not known in every case, but the final result of these nuclear changes is expressed in the cytoplasm. Since in the single cell mosaics no cell division has taken place following the first alteration in nuclear constitution, the changes in cell size, shape and composition are apparently due to some influence originating in the nucleus and passing through the nuclear membrane.

External agents, which may be physical, chemical or biological, can initiate changes in cell activity. They are either similar in their action to substances originating in the nucleus or they act upon the nuclear material in such a way as to bring about the production of more or less of the same substances. Since these induced growth alterations are sometimes permanent, in that they can be propagated indefinitely by tissue transplantation it would seem more likely that the effect

[1] *Amer. Nat.*, 72: 350, 1938.

[2] *La Cellule*, 45: 361, 1937.

of external agents is an indirect one, first altering the nuclear constitutents. These in turn have their effect in the usual way. This seems probable in view of the fact that many heritable growth variations are similar to the induced changes and these naturally arising variations can be recombined with other heritable characters whose determiners are known to be located on the chromosomes.

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MEASUREMENTS OF FOREST FIRE DANGER

ALTHOUGH the annual destruction of life and property attributable to forest fires is enormous, scientific methods of forest fire control in the United States are of comparatively recent origin. In one important phase of control, that of determining how large a network of observers is necessary for the purpose of discovering forest fires in their infancy, accurate means of determination have been largely lacking. As a result of this uncertainty, lookout points have been excessively manned in some years, thus introducing unnecessary costs, and under-manned in other years, resulting in excessive fire damage.

The problem presented here is actually one of determining the burning conditions in the forest, *i.e.*, the relative ease with which fires will start, spread and do damage. Fire danger, as the sum of these conditions is termed, has interested research foresters for several years. Beginning fire danger measurements in 1922, the Northern Rocky Mountain Forest and Range Experiment Station of the U. S. Forest Service has recently devised a method which is achieving considerable success in the field. This method depends upon a knowledge of the important factors contributing to fire danger, methods of measuring these factors and integration of measurements into single numerical results.

Important factors contributing to fire danger vary from one forest region to another, but in the northern Rocky Mountains these factors have been determined. They are:

(1) *Season of year:* In spring and early summer the green moist growth of herbaceous plants and shrubs actually hinders the progress of fires. Later, as these plants mature, they accelerate forest fire spread and intensity. At the same time hours of daily sunshine decrease with advancing season, and finally this latter process largely offsets the increased danger from maturing plants.

(2) *Fuel moisture:* The moisture content of tree needles on the forest floor and dead branchwood on the ground and just above it is largely dependent upon meteorological conditions. Its influence upon inception of fires and later behavior is considerable.

(3) *Relative humidity:* The moisture content of all forest fuels is influenced by atmospheric humidity. This relationship is especially important in the case of fine forest fuels such as tree moss, dead grass and weeds.

(4) *Wind velocity:* Rate of spread and the character of an advancing fire, as well as the rate at which forest fuels lose moisture, are dependent to a considerable degree upon wind velocity.

(5) *Visibility:* The distance at which small puffs of smoke can be detected under various stages of atmospheric transparency influences the number of lookout points that must be manned under any set of fire conditions.

(6) *Activity of fire-starting agencies:* In the northern Rocky Mountains lightning causes 72 per cent. of the forest fires. Man is a subordinate cause, although in other regions he may be of paramount importance.

To measure wind velocity and relative humidity, standard types of anemometers and psychrometers are used. For measuring fuel moisture and visibility, however, new methods had to be devised. A visibility meter, employing a glass prism and binoculars, permits a determination of the distance at which a dark ridge can barely be seen. Since this bears a definite relationship to the distance at which a small puff of smoke can be seen, a visibility distance useful to the fire observer is calculated. Two methods are used for fuel moisture determinations. An instrument called the duff hygrometer measures moisture content of forest duff; it depends upon the principle that a strip of rattan increases in length by definite amounts as it absorbs water and decreases in length by corresponding amounts as it dries. The second method is simply a weight determination of cylinders of wood; the fluctuations in weight are indications of fluctuations in moisture content.

For integrating measurements into numerical results, the fire danger meter has been employed. This is a pocket-size cardboard device somewhat similar to the Harvey exposure meter used in photography. The meter is easily adjusted to register whatever measurements of fire danger factors have been obtained. Through a small window in the meter, current fire danger is indicated. Until this year only seven classes of danger were used, but at the beginning of the present fire season, 65 classes of danger went into effect, ranging from 1.0 to 7.4.

Each class of forest fire danger indicates how many observers are necessary to provide adequate protection to the forests. Class 1 requires no men to be detailed to fire control; class 4 requires the "average season" protective organization; class 7 calls for measures to meet the most extreme danger.

So successful is the system of classifying fire danger