There are two basic methods of dealing with "unemployment, bankruptcies" and similar dislocations which you mention, one palliative and the other curative. Both may be needed. The former includes relief, emergency work, and regulation, and operates immediately; the latter aims at creation of new employment, new wealth and new values, and is a longer range program. It is primarily to the latter that engineers and scientists are devoting their major attention, since both logic and past experience demonstrate its social effectiveness, and since it can only be carried on through their type of knowledge and training. Quite properly and of necessity it is the first method which has been the chief concern of the government, since the emergency called for swift action.

We engineers and scientists, however, are disturbed lest the palliative measures be mistaken for the cure, and lest the attention and money devoted to relief and regulation should interfere with simultaneous adequate attention and support to the basic contributions which our sciences can certainly make if given a chance.

As illustrations of our cause for concern, and of the need for broader understanding by political leaders as well as engineers, I would respectfully refer to four events. (1) The engineering and scientific organizations of the country combined to urge that a small portion of the public works expenditures be devoted to research aimed at better designs and materials for public works for the future, in accordance with all enlightened industrial policy. (2) Your Science Advisory Board of prominent engineers and scientists recommended that attention be given to development of scientific knowledge on which can be built the new industries, so urgently desired by your administration to provide employment. (3) Various groups urged that the present efforts to aid the farmer be supplemented by a really adequate attempt to create new markets for farm products through discovery of new industrial uses for these products through research. None of these recommendations was acted upon. (4) Your letter to us calls attention of the public to the "dislocations" produced by science, and quite properly calls on us to try to cure them, but it does not indicate interest in the creative work and permanent values which engineers and scientists continue to regard as their chief contributions to social welfare.

My colleagues and I will do everything in our power to deal with the situations which you have called to our attention: reciprocally we most respectfully urge you and your colleagues in the government to put science to work more effectively for the national welfare, and to encourage its activities in all three of its principal settings —in governmental bureaus, in industry and in educational institutions.

Since your letter was received through the press, it is evidently your desire to call these issues to the attention of the public generally. I assume, therefore, that there is no impropriety in my replying *via* the same route.

SPECIAL ARTICLES

THE HINGHAM RED FELSITE BOULDER TRAIN

IN the northern part of the town of Hingham, Massachusetts, is an area of banded red felsite, fragments of which were carried away by the ice-sheet and deposited in a fan-shaped boulder train that extends southeastward for many miles. In 1904 Professor W. O. Crosby published a map of part of this train extending about six miles from its source. For many years the writer has been mapping the locations of several hundred specimens of red felsite found by him within eight miles of the source. In 1933 two were found in a distant part of Marshfield and later search has revealed others on Cape Cod, Martha's Vineyard and Nantucket, to a maximum distance of eighty-five miles from the source.

As long ago as 1833 Professor Edward Hitchcock found bold outcrops of this rock, which he described "as in the form of ridges." In 1904 Professor Crosby mapped three neighboring ledges, two of which have since disappeared. The only remaining one is small in area and does not stand above the ground surface. There are, however, in that vicinity long walls and ornamental gate posts built entirely of the red felsite.

The rock, which has been called by some geologists the most beautiful in Massachusetts, is deep red to purple, compact and almost flinty, and contains scattered, dull yellow lenticular masses about half an inch long. Weathered surfaces show a distinct flow-structure marked by parallel thin discontinuous sheets or flat lenses of compact red material in a gray or pinkish matrix that is shown by a lens to have a similar flow-structure but on a much smaller scale. Abundant small phenocrysts of quartz and a few larger ones of feldspar are scattered in an aphanitic ground-mass, but there are no other distinguishable minerals. The exact sort of rock has not been determined microscopically, but it is probably a rhyolite or a dacite. As it contains small fragments of rocks of other sorts as well as of the red felsite itself, it is clearly a flow-breccia. It is not much roughened by weathering, but the dark portions are often left in relief, and it is easily distinguished from other rocks. It was one of the favorite materials used by the Indians in making arrow and spear heads.

The margins of the boulder train diverge southeastward, the angle between them being about 60°.

The northern margin reaches the coast in about ten miles, at the entrance to Scituate Harbor, south of which place specimens of the red felsite are abundant in the drift, but none have been found north of a line drawn from the source of the boulders to the harbor entrance. The western margin reaches Vineyard Sound in Falmouth, fifty miles from the starting point. Specimens of red felsite were found in abundance along the western margin and to the east of it, but none west of it either on the surface or in the numerous gravel pits seen in the first eighteen miles south of the source of the train.

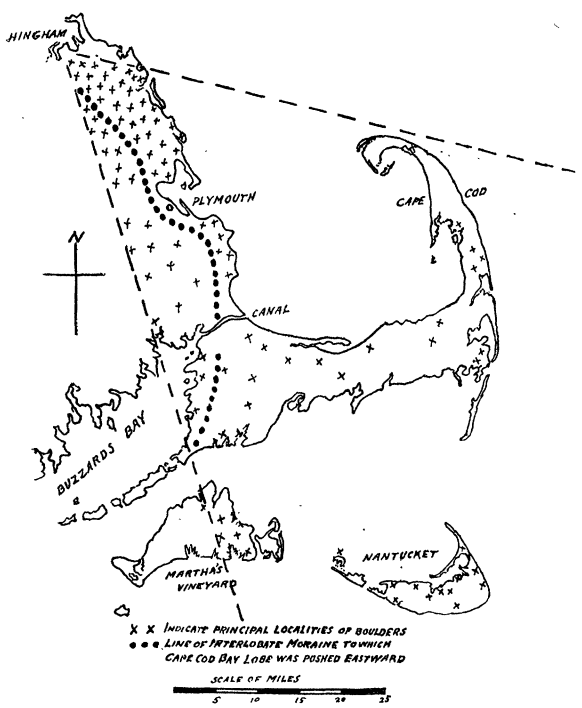

FIG. 1

If the lines delineating the margins of the fan be prolonged southeastward, the area between them will include all Cape Cod, all Nantucket and the adjacent islands and the eastern half of Martha's Vineyard. Specimens of the red felsite have been found in all those localities, but none have been found after thorough search in the western half of Martha's Vineyard. It is interesting to note that the part of that island in which fragments of red felsite have been found is the part that was occupied by the Cape Cod Bay lobe of the ice-sheet at its greatest extension, and that the Buzzard's Bay lobe which deposited the moraine in northwestern Martha's Vineyard did not carry any of the Hingham red felsite. The western margin of the boulder train reaches the Vineyard about two miles westward of West Chop, the northernmost point of the island, in the interlobate moraine.

The western boundary, according to specimens found, is a consistently straight line and apparently marks the boundary of the fan-shaped train in the early stages of glaciation, and also approximately the boundary between the lobes of the ice-sheet at that time.

Farther east a moraine, of which the Manomet Hills of Plymouth are salient features, is plainly an interlobate moraine dividing the two lobes in the last stages of glaciation. This moraine begins with the hills of Marshfield and continues with the Manomet Hills, which extend southward nearly to the Cape Cod Ship Canal. South of the canal a distinct moraine extends as far as Woods Hole. On Martha's Vineyard the original boundaries seem to have prevailed.

It seems reasonable to assume that the Buzzard's Bay lobe pushed a part of the Cape Cod Bay lobe some ten miles or more eastward without carrying away all the red felsite specimens previously deposited, and that both lobes then shared in forming the prominent moraine which now marks the division between their areas.

Professor Kirk Bryan has pointed out that specimens are absent in the areas of three spillways which existed in the melting stages of the ice-sheet. One of these occupied the low plains in Kingston, another followed the depression now occupied by the Cape Cod Ship Canal, and the third was in the region of Bass River and Dennis. Search was made in these localities, but the soil there is sandy without good exposures of gravel. Apparently whatever specimens existed there were swept away by the currents of glacial streams. I wish also to acknowledge valuable suggestions given me by Dr. Laurence La Forge.

In searching for specimens on Nantucket, the writer was assisted by Professor William F. Jones, formerly of the Massachusetts Institute of Technology, who pointed out that the easternmost part of Nantucket bears an interlobate moraine continued southward from the forearm of Cape Cod, which was a boundary between the Cape Cod Bay ice lobe and the South Channel ice lobe, which occupied what is now sea bottom east of Nantucket. Specimens found at Coskata, Sankaty and Siasconset are in the area assigned to the South Channel lobe. No geologist whom the writer has consulted knows of any area in southeastern New Hampshire or northeastern Massachusetts, over which districts the ice of the South Channel lobe must have passed, in which red felsite similar to that of Hingham is now exposed. Seemingly the ice of the Cape Cod Bay lobe at one time extended farther east over land later invaded by the South Channel lobe, which picked up material earlier deposited by the Cape Cod Bay lobe and carried it farther on.

In the more distant parts of the boulder train material was collected by the writer only where it was found in place in gravel pits and road cuts. Beach pebbles, which might have been brought by floating ice, were disregarded. On Cape Cod some gray and greenish-gray specimens were found whose structure is identical with that of the Hingham red felsite. Some of these when broken are purplish within and some are gray throughout. Whether or not these are weathered fragments of the Hingham red felsite is immaterial, as numerous pebbles of the typical red felsite were found in the same places.

In Hyde Park, fifteen miles west of the Hingham locality, are some exposures of red felsite that are part of the Mattapan volcanic complex. The rock found there is less strongly colored than that from Hingham and differs from it in the details of flow-structure. The two sorts of rock are easily distinguished. The boulder train extending from the Hyde Park area is rather scanty, and no specimens that could have been carried from there by the ice were found near the western margin of the Hingham boulder train.

The line of the terminal moraine in the northern part of Nantucket (about 83 miles from the source in Hingham) is usually recognized as the limit of the farthest advance of the ice in that locality. Specimens found south of the moraine were probably transported by streams flowing from the ice and deposited in the outwash plain. They are not technically in the boulder train and should not be so considered unless it can be shown that they were deposited by the ice of a previous glaciation or by a possible over-riding of the ice contact by the last glacier.

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PRELIMINARY STUDIES OF A CEREBRAL DISORDER OF YOUNG CHICKENS[1]

A DISORDER of chicks characterized by nervous involvements was observed on a number of poultry farms in Rhode Island during the past winter and spring. The disease appeared to be quite wide-spread over the state, and reports from other sections of New England would indicate that a similar difficulty was experienced by poultry growers in these sections.

The symptoms of the disorder resembled those described by Pappenheimer[2] and Dunlap[3] to a considerable extent. The only characteristic and consistent lesions were those of the brain in which the cerebellum was most often involved. This portion of the brain on gross examination showed edema and swelling with visible gross hemorrhages of the tissue. In some instances the same type of lesions was also noted in the cerebrum.

Observation showed the disease to be most prevalent between the ages of three to six weeks, although it has been observed by the writers in chicks as young as 16 days old. Since it appeared to involve the faster growing chicks of the lot, it was found more frequently in cockerell than in pullet chicks. The disease outbreak showed a rather sudden onset.

Cultures made from the brain and other tissues on various types of media remained sterile and suspensions of macerated brain tissue inoculated intravenously, subcranially and subcutaneously failed to incite symptoms of the disorder. Since no growth was produced on cultural media and attempts to produce the disease by inoculation had failed, it would appear that the condition was not one of an infectious nature but probably one of a nutritional type. It was observed in the field under a wide variation of management conditions, feed mixtures, breeds and strains of stock, and as a result presented a confused picture as to the possible cause of the disease.

Since an unusual situation existed during the year with respect to the quality of ingredients available for feeding purposes in comparison with previous years, indication tests were inaugurated with the hope that they would shed some light on the problem. The rations comprised various types of mixtures where some particular ingredient formed the major portion of the mixture and in some cases a deficiency ration was employed.

In only one group did the typical nervous symptoms and lesions develop. This group had been fed a ration composed of:

72.4	pounds	yellow corn meal
22.0	"	dried skim milk
2.2	"	calcium carbonate
1.1	"	sodium chloride
2.2	"	cod-liver oil

This ration produced a mortality in this group of chicks of 50 per cent., half of which showed the typical brain lesions upon autopsy.

The high corn ration was compounded on the basis that the 1935 corn crop seemed to be somewhat unusual from the standpoint of uniformity in view of its poor quality as evidenced by poor germination and high moisture content. A repeat trial is being inaugurated for confirmation purposes.

[1] Published by permission of the Director of Research as Contribution No. 495 of the Rhode Island Agricultural Experiment Station.

[2] A. Pappenheimer and M. Goettsch, *Jour. Exp. Medicine*, 53: p. 11, 1931.

[3] Glen L. Dunlap, *Jour. Amer. Vet. Med. Assoc.*, 80, n. s. Vol. 33, No. 6, pp. 880–885.