SCIENCE NEWS

Science Service, Washington, D. C.

EXPOSURE TO SILICA DUST

BY JANE STAFFORD

HOPE that the half a million workers in the United States who are exposed to silica dust in dangerous amounts may be saved from silicosis appears in the discussions of dust diseases at the Harvard School of Public Health. The effectiveness of dust control measures in preventing silicosis is seen in the experience of the South African gold mines as cited by Professor Philip Drinker, of Harvard.

"No new Rand miner who has entered the industry since August, 1923, has contracted silicosis," Professor Drinker quoted from a South African report covering a ten-and-one-half-year period. "These facts demonstrate that the engineering and medical measures which have been directed against silicosis have achieved a very significant degree of success."

In South Africa, and only there, it was realized at the outset, Professor Drinker said, that dustiness would not be controlled properly unless measured and recorded routinely. Discussing various methods that have been devised for measuring the amount of harmful silica dust, Professor Drinker said that a rapid method making use of a portable instrument was best for routine measurements.

The practical plant or mine manager wants an objective for his dust control, but unfortunately there are not and probably never will be exact figures to show a safe limit of silica particles in the air. Studies of the U. S. Public Health Service suggest some figures for dust standards. In the case of barre granite, a dustiness of ten to twenty million particles per cubic foot was found reasonably certain not to cause disability of the workers. In the anthracite coal mines, counts of 50 million per cubic foot, with five per cent. quartz in the coarse dust, seemed safe. Still another standard is desirable for the plant that handles dust of a kind that has not been proved a serious hazard to health. Scientists can not give the manager of such a plant any figures, but Professor Drinker suggests that he investigate one of the many plants that have reduced dustiness without waiting for their workers' health to be affected by the dusty atmosphere. Generally, the manager and workmen of the clean plant will uphold eloquently the advantages of dust control.

Once silicosis has developed, it is likely to progress, Dr. W. Irving Clark, physician to the Norton Company and assistant professor of industrial medicine at the Harvard School of Public Health, pointed out. The reason for this seems to be that in high concentrations silica is toxic and kills tissue. This progressive tendency of silicosis is a serious problem for industry. A worker, for example, may contract silicosis while working for one employer and may develop disabling symptoms many years later while working for another employer. If the work for the employer involved exposure to dust of an inert nature, which affects the lungs slightly as seen in x-ray pictures but does not disable the patient, the second employer may have difficulty in proving that the dust in his shop was not the cause of the disability.

Prevention is the only method of treating the lung diseases caused by dust, among which the most serious is silicosis. Dust must be eliminated from industry wherever possible, and when this is not possible the worker must use a protective device such as a respirator or a positive air pressure helmet. When examination shows the worker's lungs have become affected by the dust, it is best to keep him at work but in a non-dusty department. As shortness of breath increases, lighter work must be given him.

VITAMIN B MADE BY LABORATORY METHODS

ARTIFICIAL production by chemical methods of vitamin B_1, the beri-beri-preventing vitamin, has finally been achieved by Dr. R. R. Williams, of the Bell Telephone Laboratories, and Dr. J. K. Kline, of the Research Laboratories of Merck and Company. Collaborating in the research leading up to the vitamin synthesis, part of which was done at Columbia University and part at the laboratories of Merck and Company, were Professor H. T. Clarke, Dr. E. R. Buchman and R. E. Waterman and A. E. Ruehle.

The vitamin, it is claimed, can be produced much more cheaply by the synthetic process, difficult though it is, than by previously developed methods of extracting it from natural sources.

All higher plants synthesize vitamin B_1, but Dr. Williams and coworkers did not follow the plant method of manufacture in producing the vitamin in their laboratories. Instead they worked from simple chemical molecules, building them up step by step into the complicated molecule that is vitamin B_1. The synthetic product they achieved confirms the chemical picture of the vitamin molecule which Dr. Williams recently announced.

The synthesis is effected by combining 2 methyl 5 brom methyl 6 amino pyrimidine with 4 methyl 5 beta hydroxy ethyl thiazole. The former is somewhat related to the hypnotic Barbital; the latter is a pyridine-like sulfur containing substance more or less akin to certain of the agents used in accelerating the vulcanization of rubber and in the sensitization of photographic plates. Each of these, however, is a new substance and every atom must be in its proper place.

STUDIES OF HURRICANE WEATHER

WHAT is believed to be the first organized attempt to record meteorological conditions in the upper atmosphere during violent tropical hurricanes over the Caribbean Sea and southern states will be undertaken shortly by investigators at the Massachusetts Institute of Technology. The storms are expected between the middle of August and late October.

The expedition is divided into two sections, one to

operate in Cuba and the other in southern states in order to record the rapid changes in atmospheric conditions when the tropical storms curve inland from the Gulf of Mexico.

Delbar P. Keily and Douglas MacKiernan, Jr., will comprise the Cuba section. They will release only radio balloons, for instruments sent aloft here are not expected to be recovered. Christian Harmantas will operate in southern states releasing the smoked glass type balloons at Augusta, Ga., Montgomery, Ala., Jackson, Miss., and other southern points.

The equipment includes 80 sounding balloons and specially constructed meteorographs which the balloons will carry miles into the air to record temperature, atmospheric pressure and humidity. Thirty are equipped with tiny radio transmitters which will automatically send their readings to a base station at frequent intervals. The others will make their records on pieces of smoked glass and their data will not be known until the balloons burst in the rarefied air and fall to earth.

The balloons are expected to reach altitudes of from ten to fifteen miles before they burst and drop the shock-proofed instruments to earth. Each will carry an identification tag offering a reward for return to the institute, a system proved very successful in previous studies in other parts of the country.

The Cuban section, working with Father Eugolio Varquez, of Belen College, will use two types of radio meteorographs: the Vaisala type developed by the head of Finland's weather service and the instrument developed by Charles F. Brooks and Karl O. Lange, of Harvard's Blue Hill Observatory. The receiving station for these miniature transmitters will automatically record the data of the hurricane-swept skies.

Through the cooperation of the U. S. Weather Bureau and the special hurricane forecasting station at Jacksonville, Fla., an attempt will be made to release the balloons before the storm, not only to record the changes when it strikes, but to be sure they reach the upper air before being beaten to earth.

From the research meteorologists hope to extend present scanty knowledge on weather conditions, not so much during the fury of the storm, but when it is approaching, to facilitate forecasting.

HEAT RECORDS IN IOWA BROKEN

By Dr. Frank Thone

Heat records for 117 years in Iowa have gone down with a crash this summer, as records for intense and continuous cold splintered on last winter's ice. A statistical survey of the heart of the corn belt, county by county and town by town, conducted by Charles D. Reed, of the U. S. Weather Bureau office at Des Moines, has shown that in the short space of about six months, Iowa has experienced the most prolonged severe cold and the most prolonged severe heat since Americans first settled in the territory and began keeping records, in 1819, a few years after Thomas Jefferson had "put across" the Louisiana purchase.

It is a confirmation, in sober meteorological data, of the school boy's unconsciously ironic definition of the temperate zone as "the part of the world where is gets awfully hot in summer and awfully cold in winter."

While Mr. Reed conducted his study strictly within the boundaries of his own jurisdiction, many of his figures are of interest outside the state, for as all midwesterners are painfully aware, the heat was by no means confined to Iowa.

Many towns will date their "hottest ever" days from the summer of 1936; others will have records of hottest two days, hottest three days, hottest week, hottest two weeks, and so on up to hottest thirty-seven days. At this point Mr. Reed quit simply because he hadn't any more space on his tables, and because his office force was all worn out with adding up and averaging endless piles of data.

Along with heat went terrific evaporation rates. The official evaporimeter on the campus of the State College at Ames showed a total evaporation of fourteen and three quarters inches for the month of July. This is within two tenths of an inch of the record evaporation at Tribune, Kansas, out where it is supposed to be really dry.

The hottest afternoon that the state as a whole ever experienced was on July 14, of this year, when the average maximum temperature at 113 observing stations was 108.7 degrees. This is 2.3 degrees higher than the previous record heat, of the afternoon of August 3, 1930. On other days even higher temperatures were experienced in some parts of the state, with the mercury climbing as high as 113 to 117 degrees. The temperature map for July 14 shows that no county escaped heat of more than 100 degrees, and that most counties had to put up with 110 degrees or worse.

This year's poor corn crop is blamed by Mr. Reed more on the terrific heat than on drought. Water in the soil was short, to be sure, but the crop got along rather well until the heat was turned on. The corn did not perish of thirst, it was burned to death.

Mr. Reed's study is published in the Weather Bureau publication, *Climatological Data*, Iowa section.

ITEMS

An attack on the last major front in the war against communicable diseases is being undertaken at the Harvard School of Public Health. Victory in the first engagement was reported by Dr. William F. Wells at the symposium which is a part of the Harvard Tercentenary celebration. Disease germs that enter the body through the nose and throat, such as cause the common cold, influenza, measles, meningitis and infantile paralysis, can live in the air and be spread throught the air, Dr. Wells believes. He has proved that this is the case for some of these germs, notably influenza, and he has found that some, at least, of these germs in the air can be killed by ultra-violet rays. Influenza, pneumonia, infantile paralysis and the rest of the air-borne diseases may, in the opinion of Dr. Cecil K. Drinker, dean of the Harvard School of Public Health, in future be conquered by air purification with ultra-violet light or other means. Typhoid fever and other intestinal diseases were largely conquered by purification of water and food supplies when it was found that water and food carried the germs of the intestinal diseases.