

MEDICINE

Cold Germs from Clothes

Germ-carrying dust particles from clothing and skin are more numerous than the germs sprayed by a hearty sneeze, laboratory tests show.

► THE AIR gets more germs in it from dust off clothing and skin than from a good hearty sneeze.

Each person in the course of his normal activities looses a barrage of about one million bacteria-carrying dust particles per day.

These observations bearing on the spread of colds and other diseases through germs in the air were made by two Scottish bacteriologists, J. P. Duguid and A. T. Wallace, of the University of Edinburgh. American disease fighters will be reading details of the Scottish experiments in the *LANCET* (Nov. 27), medical journal published in London.

Many of the dust particles from skin and clothing may remain in the air for over half an hour, the Scottish scientists found. These dust particles, they think, are at least as good as sneeze-produced droplet nuclei in supplying the physical means for air-borne spread of disease. The droplet nuclei are tiny solid residues evaporated from small droplets. The nuclei stay in the air for several minutes or hours after droplets are sprayed or sneezed into the air. The larger droplets fall out of the air within one or two seconds.

Part of the Scottish experiments were made with two persons known to be harboring *Staphylococcus aureus* germs in their noses. Some of these staph. germs cause food poisoning, some cause boils, some cause what the layman calls blood poisoning. In the experiments the staph. carriers were in a small, closed room that was carefully guarded against any germs or bacteria except those of the carriers.

They went through the motions of certain laboratory procedures, to see how many dust particles would be let loose from their skin and clothing in the course of normal activity. To get the effect of vigorous activity, they "marked time" at walking pace continuously for 10 minutes, swinging the arms and raising the feet. And they tickled their noses with cotton wool swabs to bring on vigorous sneezes in quick succession.

Samples of the air after several tests with activity and sneezing were examined. From 840 cubic feet of air contaminated by 42 vigorous sneezes only 16 droplet nuclei carrying staph. germs were recovered. But 124 dust particles carrying these germs were recovered from 150 cubic feet of air contaminated by vigorous bodily activity for 150 minutes.

Surgeons will be interested in the finding that the loose cotton gown usually worn in operating rooms was not able to prevent

bacterial contamination of the air from the skin and clothing.

"Our present findings," the scientists state, "show that a large amount of dust-borne bacterial contamination of the air may be caused by ordinary body movements, and that some of the infected dust particles may remain air-borne for a time more than sufficient to allow their drifting

to the operating table from all parts of the theatre (operating room) and from rooms and corridors adjoining."

Instead of the usual operating gown, the scientists recommend a modified "boiler suit," consisting of a zipper-closed one-piece garment of heavy close-woven cotton twill with elastic bands over the cuffs of the long sleeves and heavy canvas socks sewed to the bottom of the trouser legs and worn over the shoes. This, they found, allowed only four percent of the air contamination in vigorous activity given in comparable experiments without gowning. They plan to wear this boiler-suit themselves in further studies of air contamination, to rule out the germs they themselves may be introducing into the samples they test.

Science News Letter, January 8, 1949

MATHEMATICS

Math May Decide Strategy

► THE BATTLE is the pay-off in war, but whether or not to enter a battle or a campaign in the first place may be the crucial decision. In the future, such decisions may be in the hands of mathematicians rather than generals.

At the staid meeting of the American Mathematical Society at Ohio State University in Columbus, O., the curtain was lifted on some of the involved mathematics now being invented to aid in solving such strategic problems.

The mathematics of games and the chances of one set of players winning or losing against another set of players, both following rules and perhaps making mistakes, was the subject of two papers. However, you still cannot get a perfect system of gambling from the mathematicians that will guarantee that you will break the bank.

The modern theory of games is based on the idea that with what limited knowledge you may have, in a given stage, of the rules of the game and of your opponent's position, you can decide upon the next move or play that will be the best for you. By playing in this manner, you will have the greatest chance of winning.

How to do this with assurance leads into the complicated mathematics of the two papers given: *Isomorphisms of Games and Strategic Equivalence*, by Prof. J. C. C. McKinsey, Rand Corporation, Santa Monica, Calif., a contractor to the National Military Establishment; and *Continuous Games with Polynomial Pay-off Functions*, by Dr. Melvin Dresher, also of the Rand Corporation.

Prof. McKinsey investigated under what circumstances the mathematical theory of games may be applicable to a problem of strategy and reported his highly technical mathematical findings.

Theory of continuous, two-player games of a certain kind in which successive moves are made was discussed by Dr. Dresher. On

the basis of the habitual moves, or characteristic mistakes of the opponent, the optimum moves were defined. Dr. Dresher's complicated mathematical formulae will give the first player the maximum long-run pay-off.

Science News Letter, January 8, 1949

AERONAUTICS

Ram-Jet Helicopter Under Construction

► A HELICOPTER with ram-jet engines on the tips of its lifting rotary blades is under construction in England, but the builder and construction details are held confidential for security reasons.

The design of this secret helicopter also provides more efficient means for forward speed than any similar construction which is being built outside Britain, it is said.

Essential advantages are claimed for the use of ram-jets for driving helicopter rotors. Principally, the blade tips move at a speed high enough to make the engines operate. Ram-jets must have an initial speed of some 300 miles an hour or over to operate because they rely upon speed to scoop up enough air to support combustion. They are the simplest and most advanced jets, but must be used as supplementary to take-off power.

Another important helicopter matter in Britain was the recent trial flight of Cierva Air Horse, a 24-passenger, three-rotor craft that can cruise at 116 miles an hour for a distance of 232 miles. A two-seat Cierva has also been flight tested. A Fairey Gyrodyne and a Bristol Type 171, both helicopters, successfully passed flight tests during the past months, the first setting up a new record for rotor aircraft by achieving a speed of slightly over 124 miles an hour.

Science News Letter, January 8, 1949