

SPECIAL ARTICLES

THE ANALYSIS OF "DUST" COLLECTED IN A
VACUUM CLEANER FROM THE BOOK
SHELVES OF THE RENSSELAER
POLYTECHNIC INSTITUTE
LIBRARY

Microscopical Examination.—Hair, green wool, white wool, cotton fibers, fly wings, sand grains, wood, paper, string, celluloid, pieces of finger nails, metallic iron and leather.

Life in water suspension of dust (microscopically $\times 320$), none.

Qualitative examination: Iron, aluminum, sodium and calcium.

Volatile matter—39.74 per cent.

Ash—60.26 per cent.

Silica—14.18 per cent. (hydrofluoric acid test).

Total nitrogen—1.01 per cent. (Kjeldahl method).

Nitrogen as nitrates—.015 per cent. (color test).

Nitrogen as nitrites—.0001 per cent. (color test).

Chlorine as chlorides—.15 per cent. (equivalent to .2485 per cent. of common salt).

Total carbon—15.9 per cent. (by combustion furnace).

Nutrient jelly, total bacteria count (average of 6 plates)—318,000 per gram.

Lactose litmus agar, total count—9,000 per gram.

Bacillus coli communis—present (lactose bile).

Bacteria counts were secured from one gram of the dust shaken with sterile water.

THE ANALYSIS OF LIBRARY DUST

The floor of the library is of Torazzo and the book shelves are made of sheet steel painted with gray zinc paint.

The microscopical examination of the dust showed human hair and other hair probably derived from soft hats. There were likewise wool and cotton fibers from clothing, sand from the mud tracked in on shoes and the gradual pulverizing of the floor; fly wings from dead flies and paper from book leaves. The remaining articles present explain themselves. In a water suspension of this dust no life could be detected with a lens magnifying 320 diameters.

The elements found in the qualitative examination come chiefly from the wear and tear of the floor and walls; the latter being coated with plaster of Paris probably ac-

counted for most of the calcium. Mud tracked in would account for some of the iron and aluminum present. The sodium found was due to the wear of the floor as well as perspiration from the handling of the books. Metallic iron was furnished by the nails in shoes and was removed from the dust by the use of a magnet.

The low per cent. of volatile matter, 39.74 per cent., is due to organic materials such as wool, cotton, shoe leather and rubber heels. The high ash, however, is accounted for by the compounds of iron, aluminum, calcium and silicon present as well as by the metallic iron noted above.

The total carbon content is high, but considering the amount of wool and cotton present together with paper fiber, coal dust and smoke from nearby chimneys and locomotives, this amount can be readily understood.

The chlorine is probably all present as sodium chloride (common salt) which might come, as stated above, from perspiration left on the books and mud carried in on shoes.

The total nitrogen is high, the nitrates and nitrites low, hence the nitrogen must be present almost entirely as nitrogenous organic materials such as hair and other fixed organic compounds.

The *Bacillus coli communis* was found. It may come from several sources, the most probable one being the hands while handling books. The bacillus might also be present because of the coughing, sneezing and possible expectoration of people using the library.

The total number of bacteria in the dust of such a confined space as a library would naturally be high, as the dust would catch the bacteria and have a tendency to hold them.

One of the chief points of interest connected with this analysis is the presence of *Bacillus coli communis*. Where this organism survives, more harmful bacteria might also remain, such as those producing typhoid fever, cholera, diphtheria and especially tuberculosis, which latter disease is caused by a bacillus especially able to resist the sterilizing influence of drying.

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