other arrangement is most convenient at the time. When a hundred or more references are on hand they are given to a typist who makes the copies on the form described and arranges the wording according to a uniform plan. Often the bibliography maker writes a short abstract of the article, or comments on its most useful information, and these statements of from 75 to 125 words are copied on the cards.

The system of filing used by the writer is an attempt to place the cards so they will be most readily found when looking through the index for particular articles or when making a study of a specific subject. The first or original card of each set is placed in a general file arranged alphabetically by authors; the second card (a carbon copy) is placed in its proper alphabetical order according to the type of rock or mineral or texture described; the third card (second carbon copy) is placed in a miscellaneous group, arranged alphabetically, under such headings as "chemical analyses," "environments of deposition" (with subdivisions as lakes, rivers, marine, littoral, swamp, etc.), "laboratory methods," "mineral analyses" and many others. Oftentimes the third card is placed under a separate subheading of the division which contains the second card. For instance, the cards covering the article by Takahashi, on the "Significance of Micro-crystals of Carbonates in Bituminous Shales," would be distributed (1) in "T" of authors' file, (2) in "shales" of the rock division of the file and (3) in "carbonates" in the same division. Another article, by Kindle, "A Comparative Study of Different Types of Thermal Stratification in Lakes and their Influence on the Formation of Marl," would be found by looking in the author index or under "marl" of the rock division or under "lakes" of the environment of deposition class of the miscellaneous division. Often the word used for filing purposes, or the method of classification does not appear in the title of the article but will be given in the abstract of the article at the bottom of the card. When such is the case, it has been found convenient to underline the word or clew to classification with red pencil. Cards for the article by Ross on "Altered Paleozoic Volcanic Materials and their Recognition" would be found in the author index, one under volcanic rocks and the third one in the mineral analyses class, this being an important feature of the article.

The writer recognizes that the brief description does not show clearly how every type of reference would be filed, or that the method is entirely foolproof, but he knows from experience that he can usually find a bibliographical reference in a short time, if it is in the file, without the delay of going through an authors' index.

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TEST PAPERS FOR DETECTING MAGNESIUM

A CONVENIENT method for carrying out the new organic test for magnesium is by means of a spot reaction on filter paper impregnated with the reagent. The test papers may be prepared as follows. White filter paper is immersed in a 0.01 per cent. solution of para-nitrobenzene-azo-resorcinol[1] (ortho, para-dihydroxy-azo-para-nitrobenzene) in alcohol and hung up to dry. When dry cut into pieces of about four square inches and preserve in amber bottles. To perform the test, one drop of the slightly acid solution to be tested is placed in the center of the test paper and allowed to dry. Immerse paper in a dilute sodium hydroxide solution (about 1 per cent.). In the presence of magnesium a blue spot will show in a reddish field. If the test drop contained a large amount of acid the spot will first be yellow. The reaction as performed is sensitive to about 0.005 milligrams of magnesium (one drop of a solution containing 0.1 milligram of magnesium per cc). The limitations on this procedure are the same as those noted before,[2] nickel and cobalt giving similar colored spots and large amounts of ammonium salts and organic matter reducing the sensitivity.

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SPECIAL ARTICLES

LIVING MICRO-ORGANISMS IN THE AIR OF THE ARID SOUTHWEST

NUMEROUS living micro-organisms are present at times in the air in southern Arizona. Recently the writer exposed from aeroplanes sterile agar plates and spore traps during flights primarily intended to afford information concerning the movement of the spores of wheat rusts. Two agars were used: Nutrient, pH 7.2, and potato, pH 6.8. Exposures were uniformly two minutes in length. Some of the results are given in the following table.

No spores of wheat rust were found, but further trials may discover them. Among the fungi were species of Aspergillus and Penicillium, Macrosporium, Alternaria, Cladosporium and one yeast. White and

[1] Purchasable from Eastman Kodak Company, Rochester, New York, or may be prepared by detailed method given by Stone, *Chem.-Analyst*, 19: 6, May, 1930.

[2] Riugh, *J. A. C. S.*, 51: 1456, 1929; Engel, *ibid.*, 52: 1812, 1930.

April 11, 1930

Plane, Fokker, trimotor; weather clear, sunny; surface air temperature, 28° C.; air temperature aloft, 24° C. at 5,000 feet and 22° C. at 5,800 feet; surface wind S., 5.5 miles; wind at 6,000 feet S.S.E., 8 miles.

Plate no.	Medium	Altitude above sea-level, ft.	Speed of plane, M.P.H.	Number of colonies		
				Fungi	Bacteria	Total
1	Pot.	5,500		19	222	241
2	Nutr.	5,700	110–115	10	103	113
3						
4	Nutr.	5,500–5,800		11	165	176
5	Pot.	5,200	120	25	151	176
6	"	5,000	125	23	103	126
7	Nutr.	4,800–5,000		6	66	72
8	Pot.	4,300–4,500	115–120	20	43	63
9	"	2,300–1,500		38	158	196
		April 12, 1930				
		Same plane; weather clear, sunny, quiet.				
10	Nutr.	3,100–3,700	95–100	50	454	504
11	"	6,000–6,400	100–105	1	211	212
12	"	7,000–7,200	100–110	8	95	103

gray colonies of bacteria predominated, although there were numerous chromogens. The fungi and bacteria will be tested for pathogenicity on the most important economic plants of Arizona.

The viability of micro-organisms in arid regions has not been extensively studied, possibly because institutions of research usually are not located in or near deserts. On this subject the opinion is widely held that bacteria and fungi are quickly killed by the prevailing conditions of light, heat and dryness. No doubt the almost proverbial health of the native human inhabitants of arid regions has something to do with this belief, although their health is probably the result of the stimulating effect of outdoor life rather than of the absence of germs. At any rate, parasitic plant diseases are common, and bacteria and other micro-organisms are abundantly present.

The abundance of living organisms in surface dust and soil in Arizona has been shown by two investigators. In 1919 Miss Mary Estill,[1] now Professor M. E. Caldwell, isolated more than thirty species of bacteria from dust obtained in the streets of Tucson and adjacent country. Later the same investigator[2] showed that the bacterium of tuberculosis retained its virulence in dust, outdoors, for as long as seventy-two hours. Dr. Laetitia M. Snow[3] in 1926 studied the bacterial flora of wind-blown sand obtained near Tucson and isolated about eight times as many organisms as were later found to live in the wind-blown sand of dunes at Sandwich, Massachusetts.

That the micro-organisms in air ride on particles of dust has long been known. Dust and wind-blown sand carrying bacteria, fungal spores and even pieces of mycelia are lifted upward by the spiral "twisters" and the wind-storms of arid regions. Granted that the organisms remain alive during the aerial movement, the distance that they are carried becomes an important question. This will depend upon the height to which the dust and sand ascend as well as upon the air current. If the germ-laden particles reach the upper air currents the distance may be great. During the flights made by the writer, a maximum altitude of 7,200 feet above sea-level or 5,700 feet above the surface was attained and living bacteria found. Therefore dust must be lifted to that height. Redway[4] states that wind-blown dust rarely ascends over 2,000 feet. On the other hand, MacMahon,[5] an aviator, says of a South American trip, "On still another flight, while crossing the pampas, a sandstorm blowing 6,000 feet into the air forced us to fly blind for a time."

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THE RELATION OF THE THYROID AND PITUITARY GLANDS TO MOULTING IN TRITURUS VIRIDESCENS

STOPPING of the periodic moult in *Triturus viridescens* can be brought about by extirpation of certain of the endocrine glands. For example,[1] thyroidectomy inhibits skin shedding, and animals lacking thyroids become gradually blacker and blacker as layer after layer of cornified cells is formed and not sloughed off. This reaction is usually noticeable within two weeks (depending somewhat on the temperature) and by four weeks is markedly evident. Hypophysectomy also causes a cessation of moulting, and the experiments done by two of the authors (Adams and Kuder) show that the pars anterior is the part intimately involved in this result. Removal of it alone produces the same effect (lack of moulting and

[1] Mary Howard Estill, master's thesis, University of Arizona.

[2] Mary Estill Caldwell, "Viability of Mycobacterium Tuberculosis in a Semi-arid Environment," *Jour. Infect. Dis.*, 37: 465–472, 1925.

[3] Laetitia M. Snow, "A Comparative Study of the Bacterial Flora of Wind-blown Soil: I. Arroyo Bank Soil, Tucson, Arizona," *Soil Sci.*, 21: 143–161, 1926; "A Comparative Study of the Bacterial Flora of Wind-blown soil: II. Atlantic Coast Sand Dunes, Sandwich, Massachusetts," *Soil Sci.*, 24: 39–48, 1927.

[4] Jacques W. Redway, "The Dust of the Upper Air," *Ecology*, 2: 104–109, 1921.

[5] Harold E. MacMahon, "Blazing New Trails," *Liberty Magazine*, p. 47, May 3, 1930.

[1] A. E. Adams and L. Richards, "The Effect of Thyroidectomy in *Triturus viridescens*," abstract, *Anat. Rec.*, 44: 222, 1929.