of such a change in aim. It will undoubtedly produce a new type of school, aimed at the average person, a sort of folk high school and far from the old college-dominated school of the last generation.

As an example of the trend Dr. S. R. Powers,[5] of Columbia University, describes the results of a five-year survey of science teaching in high schools and explains plans for a three-year experimental plan to be carried out in several large cities. Dr. Powers states that the conventional treatment of sciences and other subjects will go by the board. Instead "scrambled" courses will be given. "It is not necessary to clutter the mind with equations," says Dr. Powers. "Students will pick up what they need to know later in life." Of course "vexing questions may arise when college entrance credits must be met, but that is a minor question." This study will be financed, and has been, by a $160,000 grant from the General Education Board.

Whatever orthodox college faculty men may think of such a business as this, the fact is they must recognize that the high school is in a state of flux. The pressure on it to change its aims and methods, more nearly to serve the average graduate, will increase. And the college preparatory student will be forced to take pot luck with the crowd. Diluted courses, "scrambled" courses, survey courses, are the new dish to be served up.

It is into this apparently insoluble problem that the college man needs to peer in the hope of finding a way out. The more the high school aims at the average terminal student the less can it prepare efficiently a well-trained recruit for the college. The very largest high schools might segregate the two groups and attempt to serve each separately, but it is not now being done in most cases nor does it seem likely. At any rate the smaller schools which handle the greater percentage of the students could not serve two ends. If the college-bound student represents the future leadership in all branches, as seems obvious, then it is surely too bad to condemn him to four years at half speed, as seems inevitable in the future.

Perhaps separate technical high schools, not only in cities, but in rural areas also, are the answer. That is a matter to be worked out. It seems very definite that the colleges must expect less well-trained material entering the freshman classes as the emphasis in high school shifts from the traditional goal, unless something is done to meet the needs of the better but smaller and more important group of potential leaders who go on to college.

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[5] *New York Times,* January 19, 1941, p. 6D.

P-AMINOBENZOIC ACID, AN ESSENTIAL METABOLITE FOR AUTOTROPHIC ORGANISMS

IT was earlier shown that p-aminobenzoic acid nullifies the inhibitory effect of sulfanilamide and its derivatives on the growth of bacteria as well *in vitro* (Woods, Fildes[1] and others) as *in vivo* (Selbie[2] and others). As an explanation of this fact it was suggested that p-aminobenzoic acid is a necessary factor in the metabolism of these organisms: an essential metabolite according to Fildes.[3]

A similar effect of p-aminobenzoic acid was also shown in experiments *in vivo* with the virus of Lymphogranuloma venereum by Findlay.[4]

Recently Ansbacher[5] and Martin[6] gave experimental evidences indicating the importance of p-aminobenzoic acid as a chromotrichial factor in rats and mice and further as a growth promoting factor in chicks, which made Ansbacher consider the p-aminobenzoic acid to be a vitamin, belonging to the B complex.

The significance of p-aminobenzoic acid, however, does not seem to be limited to the animals and bacteria just mentioned. Experiments conducted in the Bacteriological Laboratory of the Swedish State (Stockholm) indicate that p-aminobenzoic acid is of the same importance to autotrophic plants as to the heterotrophically living bacteria. In experiments with two strains of the small fresh-water diatom *Nitzschia palea* var. *debilis,* which were grown on an agar made up with tap-water and mineral salts (cfr. Wiedling[7]), an inhibition of the effect of sulfonamide and its derivatives (sulfapyridine and sulfathiazol) was produced by p-aminobenzoic acid.

Evidently there are reasons to interpret these experiences as indicating that p-aminobenzoic acid is of a universal significance in the metabolism of plants, both autotrophic and heterotrophic, and perhaps also in the metabolism of animals and viruses.

Detailed data will appear later.

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CULEX QUINQUEFASCIATUS, A NEW VECTOR OF PLASMODIUM GALLINACEUM

Plasmodium gallinaceum Brumpt, 1935, the cause

[1] D. D. Woods and P. Fildes, *Chem. Ind.,* 59: 133, 1940.
[2] F. R. Selbie, *Brit. Jour. Exp. Path.,* 21: 90, 1940.
[3] P. Fildes, *Lancet,* 238: 955, 1940.
[4] G. M. Findlay, *Brit. Jour. Exp. Path.,* 21: 356, 1940.
[5] S. Ansbacher, SCIENCE, 93: 164, 1941.
[6] G. J. Martin and S. Ansbacher, *Jour. Biol. Chem.,* 138: 441, 1941.
[7] S. Wiedling, *Bot. Not.,* 37, 1941.

of malaria of fowls, is transmitted by *Aedes aegypti* and *A. albopictus* (Brumpt, 1936),[1] as well as by *Aedes geniculatus* (Roubaud, Colas-Belcour and Mathis, 1939).[2] *Culex fatigans, C. pipiens* and *Culex* sp. (Richelieu, Indre-et-Loire, France) tested by Brumpt (1936) proved to be refractory to infection by this plasmodium. We do not know of any other mosquito reported to date as a vector of this species of *Plasmodium*.

Recently, in a lot of *Aedes aegypti* which had been released to feed on chickens infected with *Plasmodium gallinaceum,* there was accidentally introduced a specimen of *Culex quinquefasciatus* from Iguala, Gro. that emerged in another lot of this species raised in the laboratory. On dissecting this insect, abundant sporozoites were found in its salivary glands. The mosquitoes had fed for the first time 29 days before on chickens infected with *Plasmodium*. They had been kept at ordinary laboratory temperatures approximating 20–25 degrees Centigrade.

In view of the abundance of this species of mosquito in the country, and in view of the negative results obtained previously in attempts to infect species of the genus *Culex*, it seems important to submit a preliminary report of our findings in this case of infection, which to date is the only one recorded.

Experiments are at present under way in this Institute to determine the susceptibility of this species of *Culex* to infection by *Plasmodium gallinaceum,* as well as to determine the possibility of finding other vectors among mosquitoes of the region.

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POLISHED AREAS ON GRANITIC PORPHYRIES OF THE HUECO AND CORNUDAS MOUNTAINS OF TEXAS AND NEW MEXICO[1]

RECENTLY while engaged in making geologic observations in the Hueco and Cornudas Mountains of western Texas and New Mexico I became aware of the repeated occurrence of large highly polished patches of rock which had escaped my notice before this. The Huecos and Cornudas, like other granitic intrusive masses, upon weathering have developed large open fractures, niches and even sizable caves, many of which have openings at the level of the ground. There was observed at the entrance to one of these small crevice caves a highly polished rock surface on the hanging-wall side. The footwall, however, showed the same rough weathered appearance as the inner and outer surface about the polished area. Subsequently it was found that at practically all other slanting cavernous openings, the polished surface, if present, appeared on the hanging-wall side. I do not recall having seen polished surfaces upon rocks which were high above the ground surface or upon the tops of rocks.

Later I was surprised to see the same type of polished surface on the sides of large outlying boulders, some fifteen to twenty feet in diameter, which had broken loose from the high cliffs and had tumbled out onto the surrounding apron of detrital wash. My recollection is that most of these polished areas are on the south side of the boulders and near their edges or corners. It was noted that all the patches are similar in size and position. They begin at a point about two feet off ground, often extending to a height of seven to nine feet and seldom cover a space more than five to ten feet wide, whether at the entrance to openings or on isolated boulders.

Are these polished patches remnants of once extensive surfaces of smooth rock, or are they the result of local action on limited areas such as the effects produced by desert sand-blasting, faulting or other processes? One may elaborate to no end on all the possible ways to explain such a phenomenon, but a concept that appeals to the writer and which may be of interest to the anthropologist and archeologist as well as the geologist is that these polished areas may be the "itching" or rubbing posts of prehistoric animals of the Basket Maker I or earlier time. My cursory data seem to accord with such a theory. Their height, width and position agree well with the size and habits of animals that congregate about such places for rest and shelter. The hanging-wall at the entrance to a shelter, inclined as so many of them are at an angle of about 70°, would serve as a convenient rubbing post to animals of all sizes—ground sloth, elephant, bear, antelope, etc. The footwall could hardly be made to serve such a purpose and would remain unpolished. Continual rubbing of the rocks would not only develop a polished surface but would impregnate the fine interstices of the rock with fatty oils from the skin which would wax and thus preserve these surfaces. The smooth and highly polished surfaces found on posts, pipes and other hard and resistant objects, produced by cattle in satisfying their urge to scratch, is a common sight about water holes on the Western ranges.

Another point of interest is the fact that the polished area begins about two feet above the present position of the surface of the ground. This may be

[1] E. Brumpt, *Compt. Rend. Acad. Sci.*, 203: 750; *idem, Ann. Paras. Hum. et Comp.*, 14: 597, 1936.

[2] E. Roubaud, J. Colas-Belcour and M. Mathis, *Bull. Soc. Path. Exot.*, 32: 28, 1939.

[1] Published by permission of the Director, U. S. Geological Survey.