been added syrup iodid of iron USP." This was added to improve the mineral composition of the diet. The author states that the results of iron therapy have been studied by him on fifty-one cases of human pellagra and they are of an encouraging nature. Moreover, he has been able to cure black-tongue in dogs by giving iron intravenously.

The correlation between the iron and the vitamin G content of certain foods is striking. In addition to the above-mentioned foods it is known that spinach, leaves of velvet beans and soy beans, pig's liver and even the Minot and Murphy liver extract are good sources of the vitamin. However milk which is a rich source of vitamin G is relatively low in iron, and molasses, which forms a staple article of diet among poor farmers in the South, is rich in iron.

Whether or not the vitamin which prevents the pellagra-like condition and promotes growth in rats is identical with a factor preventing human pellagra has not been determined. Aykroyd[3] recently has shown that maize contains about as much vitamin B_2 (G) as rice and millet, as measured by the rat-growth method, but people who live largely on rice are not pellagrous, while the disease is prevalent among maize-eating peoples.

In this laboratory we have been conducting experiments to determine the vitamin G (B_2) content of some foods and of various preparations. Rats were used, and the basal diet contained ferric citrate in such amounts that there was present 0.29 mg of iron in each gram of diet. In every litter of animals used for experimental work one rat was maintained on the basal diet alone as a negative control, and the food consumed by these animals even when sick was rarely less than 1.5–2 grams daily. Out of thirty-three of these negative controls only three have failed to show evidence of dermatitis in eight weeks. In most cases the condition was evident in three or four weeks. None of the animals gained more than ten grams in eight weeks, and the majority lost from five to ten grams. From this evidence it would seem that the animals were deficient in vitamin G (B_2). Throughout the experimental period, moreover, the animals were housed in metal cages and in many cases the iron was exposed. In addition, the loose screen bottom of the cage was raised above the pan by means of an iron ring. While no copper was given as such it seems possible that from the cages and from the salts used in the diet sufficient copper may have been present to satisfy the needs of the animals.

In order to satisfy ourselves on this point, however, six animals were given 0.5 mg of iron and 0.1 mg of copper daily six days a week as $FeCl_3$ and $CuSO_4$ solutions, respectively, as recommended by Steenbock.[4] Three of the animals had been maintained for ten weeks on the experimental diet alone, and they were in a very poor condition. The other three were young rats which had just been depleted of their store of the vitamin. The solutions were given as the only supplement to the basal diet and they were well eaten; and when given in addition to the iron and presumably copper present in the diet would seem to have been sufficient to prevent anemia. In neither group, however, was there any improvement due to iron therapy. The rats which had severe dermatitis did not improve and the second group began to show evidence of vitamin G (B_2) deficiency in about four weeks. In no case was there a gain in weight such as was seen in the experiments reported by Steenbock and which might have been expected had the animals been anemic.

It seems probable therefore that if human pellagra and black-tongue of dogs are shown to be iron deficiency diseases, the pellagra-like symptoms which manifest themselves as a result of vitamin G (B_2) deficiency in rats are not analogous to the other conditions.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A LIGHT FILTER FOR MICROSCOPES

IN microscopes there are two points where light filters can be introduced without being imaged and yet produce equal filtering power throughout the field. These positions are known as the entrance pupil and the exit pupil. The entrance pupil is the aperture of the substage condenser where the iris diaphragm is located. The exit pupil is better known as the Ramsden disc and is in the position the eye occupies when looking through the microscope. Either position is correct for a filter, but because of certain disadvantages in placing the filter at the exit pupil, all standard filters are made to occupy the entrance pupil. The disadvantages in locating the filter at the exit pupil are that it cuts down the eye distance; the filtering density must be greater to cause the same value of light filtration; and any dirt, scratches, etc., on the filter are more easily seen and may be quite annoying. A filter located at the entrance pupil has none of these disadvantages but is in an exceedingly

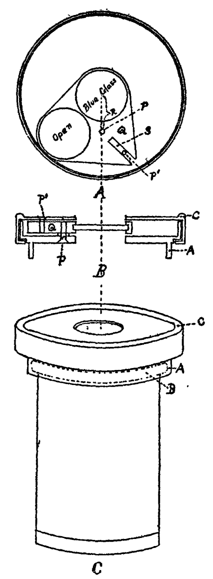
[3] W. R. Aykroyd, *Biochem. Jour.*, 24, No. 5, 1479, 1930.

[4] E. B. Hart, H. Steenbock, J. Waddell, and C. A. Elvehjem, *Jour. Biol. Chem.*, 77: 797, 1930.

annoying place to get at when throwing the filter on or off frequently, especially if substage lights are used. Breakage and loss is also frequent with filters in this position.

In finer cytological work, where the advantages of contrast of normal illumination with that of the shorter wave filters is appreciable, the rapid shifting of substage filters is very inconvenient. The writer has therefore been using a fixture which introduces the filter at the exit pupil where it can be rapidly and conveniently thrown on or off. This filter is so closely apposed to the eyepiece that the cutting down of eye distance is not appreciable. The fixture also adequately protects the filter from dust, scratches and breakage. It consists of a fixed cap that fits over the eyepiece. To the upper surface of this piece a movable quadrant is attached in which the filter aperture and an open aperture is contained. Either of these apertures can be shifted in place over the lens by simply swinging the quadrant to the right or left on its axis. This is accomplished by means of a movable cap that fits over the fixed part and from which a pin fits into a slot on the quadrant. Any movement of the cap to the right or left will therefore throw the quadrant and its apertures in the opposite direction.

From the diagram it will be seen that this device consists of a machined support block (A) which carries a lip that engages the knurled rim (B) of the eyepiece with a firm push fit. The quadrant (Q) which carries the filter glass rotates freely about the bearing pin (P), which is fixed to the support block. Another machined piece (C) (the movable block) fits concentrically over the fixed block in such a way that (C) can be rotated freely about it with the fingers. The quadrant is slotted at (S) to engage a second pin (P′) fixed to the movable block.



A. Top view with movable cap removed. B. Sectional view. C. Eyepiece with fixture in position.

In the position shown in the plan view the glass filter has been swung into position by simply turning the movable piece (C) to the right. The limit of this motion is reached when the left hand edge of the quadrant abuts against the lip of the fixed block (A), as shown. The radius (R) is such as to swing the filter into correct axial relationship with the eyepiece.

When the filter is not needed the movable piece is turned to the left This carries the quadrant to the right rotating about the fixed pin (P) and impelled by the movable pin (P′). The other edge of the quadrant now abuts against the rim of the block, swinging the "open" part of the quadrant into its correct position.

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SPECIAL ARTICLES

CONTROL OF POWDERY MILDEW AND RED SPIDER ON GREENHOUSE CUCUMBERS[1]

DUSTING greenhouse cucumbers with a high grade sulphur dust is the common method of combating powdery mildew, *Erysiphe cichoracearum.* Such dusts, while generally effective, occasionally fail. In an attempt to find a more efficient method of controlling the disease, cucumber vines in a commercial greenhouse were sprayed with hydrophilic colloidal sulphur, a product recently manufactured by the Ansul Chemical Company. This product is prepared in paste form and is a true hydrophilic colloid.

[1] Published with the approval of the director of the Ohio Agricultural Experiment Station.

Preliminary sprays were applied before mildew made its appearance. These were made to determine the strength of sulphur spray which greenhouse cucumber vines would tolerate and what effect hydrophilic colloidal sulphur would have on the control of red spider, *Tetranychus telarius.*

The following sprays were applied March 23, 1931: 5 pounds of the colloidal sulphur to 100 gallons of water and 10 to 100 with and without 0.5 per cent. Penetrol.

An examination of the vines several days later showed that all sprays gave a perfect kill of spider. The 5 to 100 sulphur sprays caused slight leaf injury and the 10 to 100, rather severe leaf injury. Both