back from the present strand line. Tibia and tarsus were the parts retrieved here by Dr. F. C. Clark, of Santa Monica. The two segments were assigned to the same species on purely biological grounds, there being no immediate proximity within the matrix.

Later an almost exact duplicate of the tarsus was taken at Arnold's Lumber Yard locality in San Pedro thirty miles to the southeast. Here also were found specimens of a femur that were ascribed to the same species, again on purely biological grounds. The specimen from Ventura is considered to be of Lower San Pedro age, whereas the former specimens are from Upper San Pedro. Just what is the time hiatus between Upper and Lower San Pedro remains uncertain, but there is evidence of considerable orogeny having taken place in the interim. This was very generously checked for me by Dr. U. S. Grant in oral discussion of the Ventura area. Bird species are apparently of rather long life span compared with mammals, hence there appears no cause for challenge of identity on the basis of age. Molluscan species associated in the matrix include *Nassarius fossatus* Gld., *Olivella pedroana* (Conrad) and *Cryptomya californica* Conrad.

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WHY DANDELIONS?[1]

A RECENT investigation at the Massachusetts Agricultural Experiment Station has thrown more light on the food value of the common dandelion.

Dandelions in the form of greens have had a place in our diet in the spring of the year for generations. The indulgence in green foods of this kind was very appropriate after a long winter diet of cured or preserved foods. The literature, however, confirms the suspicion that people ate such things largely because they liked them and not because of any specific knowledge of their nutritional value.

Results obtained at this station have shown the dandelion to have a high protein (15.76 per cent.) and a very low fiber (9.79 per cent.) content, accompanied by a high ash, and to contain such minerals as calcium and phosphorus in abundance.

A comparison has been made of the amounts of some of the minerals with that found in other vegetables commonly used as greens.

(*Dry matter*)	*Ca* Per cent.	*Mg* Per cent.	*P* Per cent.
Dandelions	1.60	0.46	0.51
Mangold leaves[2]	1.20	0.89	0.18
Lettuce (common)[2]	0.59	0.20	0.26
Cabbage leaves[2]	1.82	0.33	0.28
Spinach[2]	1.40	0.62	0.36

[2] Analyses given in "Compilation of Analyses," Massachusetts Agricultural Experiment Station, 1919.

The dandelion contains much more phosphorus than any of the others listed and is exceeded only by cabbage leaves in calcium and by mangold leaves and spinach in magnesium. Spinach, probably the most popular of those mentioned, is slightly lower than the dandelion in content of calcium and significantly lower in phosphorus. The dandelion can therefore be rated as an excellent source of these minerals. Perhaps we may therefore say that our taste is not as fallacious as we sometimes think.

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DR. BRITTON'S INTEREST IN MINING AND GEOLOGY

DR. H. H. RUSBY'S excellent obituary of N. L. Britton, in your August 3 issue, omits something that would have thrown interesting light on the story of how the Director of the Botanical Garden, to avoid an annoying delay, went out and personally ran a rock-drill for several hours. N. L. Britton graduated from the Columbia School of Mines, with the degree of engineer of mines, with class of 1879. Presumably he took the mining course because it was the best curriculum in general science that Columbia College then offered. From 1879 to 1887 he was assistant in geology in the School of Mines, becoming instructor on botany in the latter year. Although it is therefore not remarkable that he was competent to run a rock-drill, he was, nevertheless, a man of wide as well as great ability.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

IODINE–POTASSIUM–IODIDE, AS A FIXATIVE AND DIFFERENTIAL STAIN[1]

IODINE-POTASSIUM-IODIDE, prepared according to the usual formula of one gram of iodine crystals, two grams of potassium iodide and 300 cc of water, was found to be useful as a fixative and differential stain in studies on the germination of conidia of the Peronosporales. Its value in this connection was discovered while studying the relation of time and temperature to the rate and percentage of germination of conidia of *Peronospora effusa*. In these studies drops of a suspension of conidia in water were placed on

[1] Contribution No. 192 of the Massachusetts Agricultural Experiment Station.

[1] Presented before the Biology Section of the Virginia Academy of Science, April 23, 1931.

microscope slides which were kept in moist chambers in the various incubators. One slide bearing two drops of the conidial suspension was removed from each incubator at definite intervals and the percentage of germination and length of germ-tubes in each drop noted. Two difficulties were encountered in these studies. First, the continued germination of the conidia and elongation of the germ-tubes after the slides were removed from the incubators resulted in considerable error in the last drops of each group that were examined. Second, the conidia were hyaline and therefore difficult to see. Because of these difficulties an attempt was made to find a means of killing the conidia promptly when they were removed from the incubators and to find a stain that would make them more readily visible. Of the several fungicides and stains tested, iodine-potassium-iodide was found to be the most satisfactory because it served for both purposes and in addition differentiated between the germinated and ungerminated conidia.

In practise, one drop of the iodine-potassium-iodide solution was added to each drop of spores as soon as they were taken from the incubator. This almost instantly killed the conidia and stained the ungerminated ones a golden brown color. The germ-tubes of the recently germinated conidia were also stained golden brown, but the empty spore cases remained colorless. In the more advanced stages of germination the germ-tubes did not stain at all or only at the tip.

The differential property of the stain appears to be due to the fact that it stains only the protoplasm of the conidium and not the conidial or germ-tube wall. The protoplasm of the germinating conidium migrates into the germ-tube and is eventually consumed during its growth. Therefore, the germinated conidia are stained only in the germ-tube or not at all.

Iodine-potassium-iodide was used with equally good results in studying the germination of conidia of *Peronospora parasitica*. It was also used as a stain for fresh conidia of *Peronospora lami* and *Plasmopara gerani* and dried specimens of *Peronospora destructor, Bremia lactucae, Basidiophora kellermani* and *Albugo candida*.

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AN IMPROVED METHOD OF DIRECT SMEAR EXAMINATION FOR ACID-FAST BACILLI IN SPUTUMS[1]

THE routine method of examining sputums for acid-fast bacilli by taking a loopful of the sputum from the sputum jar frequently gives negative results when the number of tubercle bacilli in the sputum is comparatively small. Concentration of a fairly large amount of sputum is usually resorted to in such cases in order to obtain a positive result. But this is time-consuming and therefore not practicable where a large number of specimens are examined.

We found in connection with another investigation that by carefully selecting the material and thorough examination of the smears, we were able to obtain the same results on the direct examination of the sputum as after concentration. The method employed was as follows:

DIRECT SMEAR EXAMINATION

The sputum was poured into a petri dish and was examined for mucus flakes. If the sputum was fluid, the flakes were collected by means of a pipette and were expelled on two chemically clean, new slides making fairly thick smears. If the sputum was very mucoid, a heavy wire loop was used instead of a pipette. The smears were allowed to dry in the air and were then stained by a slightly modified Ziehl-Neelsen method, in which the counterstain was 1–1000 dilution of brilliant green instead of methylene blue. Both smears were thoroughly examined for acid-fast bacilli with the aid of a mechanical stage.

When the result was negative on the direct examination, the sputum was concentrated in the following manner.

CONCENTRATION OF SPUTUM

The sputum was pipetted into chemically clean 50 cc centrifuge tubes, which contained glass beads. An equal amount of 3 per cent. NaOH was added, the tube was stoppered with a sterile solid rubber stopper and, after vigorous shaking by hand, it was incubated at 37° C. for from 30 to 45 minutes. The tube was shaken every 5 minutes during incubation to prevent sedimentation. The mixture was then centrifuged at high speed for one hour and the sediment again examined for acid-fast bacilli.

We examined in this manner 369 specimens from 268 suspected and definite cases of tuberculosis, and in each instance the result on the direct smear examination of the unconcentrated sputums was identical with that obtained after concentration. In no instance was a positive result obtained after concentration when it was found negative on the direct smear.

It would therefore seem that by carefully selecting the material and thorough examination of the smears,

[1] From the Bureau of Laboratories, New York City Department of Health, under the direction of Dr. William H. Park.