Dr. Lyman will enter upon his new duties on January 1.

PROFESSOR LEROY PATTON, formerly of Muskingum College, Ohio, has been appointed associate geologist of the Bureau of Economic Geology in the University of Texas. Dr. E. H. Sellards, who has been with this bureau several years, has been promoted to be chief geologist, Professor T. L. Bailey, from the University of California, has accepted the position of assistant geologist, vacated by Professor W. S. Adkins a year ago, and Miss Dorothy Shoaf, from the University of Chicago, has been appointed curator of the collections.

DR. J. L. SHELLSHEAR, of Sydney, Australia, has been appointed to the chair of anatomy in the new College of Medicine of Hongkong University.

DISCUSSION AND CORRESPONDENCE

NOTE ON THE DISSOCIATION OF CARBON IN THE INTENSIVE ARC

SOME two years ago while experimenting with the extremely powerful arcs used in the Sperry search lights we noted the singular color and peculiar spectrum in the "negative tongue" which appears at currents of 100 amperes and upwards. It develops rather suddenly as a core of the negative flame, suggesting the inner cone of a blast lamp save in color, which is pale purplish.

The spectroscope disclosed a small number of clearly marked lines superimposed on fainter hazy and complex bands, due to the surrounding arc flame. Examining the tongue spectrum of the lines from time to time, we found substantially the same spectrum from various makes of unmineralized carbons, foreign and domestic. Finally, using a five inch achromatic condenser to throw the image of the tongue on a ground glass we examined it in detail with a direct vision spectroscope equipped with a scale, comparison prism and holder for spectrum tubes.

We thus found as characteristic of the tongue spectrum, some fifteen well defined lines. Of these, seven were good coincidences with the most conspicuous of the well known helium lines, and two others with Hα and Hβ.

The He lines were wl: 7066, 6678, 5876, 5048, 5016, 4922, 4388.

Five of these lines belong to the single line, so-called Parhelium series, being the brightest lines of the principal and second subordinate series, and the three of the first subordinate series.

Of the doublet system the chief lines of the sharp and diffuse series respectively appear, not very brilliantly, while we have not yet detected any of the enhanced series. All indications point to the dissociation of a certain proportion of carbon nuclei with the consequent appearance of He due to the immense concentration of energy in this 150 ampere arc. The H lines may be due to water-vapor absorbed by the soft carbon core, or perhaps to further dissociation. We are now setting up a concave grating spectrograph for the closer examination of the tongue spectrum under much higher dispersion, and hence with a less obtrusive background. We hope that the evidently very high ionization power here manifested may lead us to interesting developments with still other elements.

Our thanks are due to the courtesy of Mr. Sperry in extending the great facilities of his laboratory.

LOUIS BELL
P. R. BASSETT

THE DETERMINATION OF FAT IN CREAM

TO THE EDITOR OF SCIENCE: The authors (E. G. Mahin and R. H. Carr) of a paper on "Errors in the Determination of Fat in Cream," read at the Birmingham meeting of the American Chemical Society, have experienced considerable surprise at the tone of a letter by H. W. Gregory, appearing in the issue of SCIENCE for September 15, 1922, in which he discusses our work upon this subject. Professor Gregory has based his criticisms upon a mere advance abstract, containing no details of experiment or reasoning, and without adequate knowledge of the real points at issue.

In the original paper by Mahin and Carr (not yet published) we have simply called attention to a hitherto unsuspected error in the almost universally used "glymol" method for making fat readings in the Babcock tests on

cream, and we have stated very plainly that there is little or no error if the glymol is added slowly, with the tip of the pipette resting against the neck of the bottle *near the butter fat layer* but (and this is the important point) that by the manner in which the glymol is likely to be added by the average dairy helper there is nearly always an error in the direction of low readings.

That this conclusion was entirely justified will, we believe, be apparent when we state that the results quoted in the original paper were obtained in Professor Gregory's own laboratory, both of the authors watching the tests as they were made in a purely routine manner, by the regular tester and upon creams as they were received in the laboratory. We made no suggestions to the tester, merely asking permission to take readings before and after each addition of glymol. Our observations were confirmed by the tester at the time they were made.

That this is not to be taken as a criticism of the work of the tester, or as a charge of carelessness or wilful negligence, or of lax administration of any laws bearing upon the subject, should be evident when we state that it was only after a considerable amount of subsequent experimentation that we stumbled upon the explanation of the error, which is to be found in the fact that the tester usually follows the very natural method of placing the tip of the pipette just inside the top of the bottle neck, then allowing the oil to flow at the full delivery speed of the pipette into the bottle. This *cause* of error was discovered in March, 1922, and it seems obvious that Professor Gregory's inspectors could not have found and checked the incorrect method for 1,800 or more testers *during the past year,* when neither they nor we nor (so far as is known) any one else knew that the method was incorrect.

We regret very much that our statement regarding the importance of the error in Indiana was interpreted as a charge that Indiana creameries "are beating our producers out of $20,000 worth of cream per year." The case of ten Indiana creameries was cited merely because we happened to have approximate figures on production for 1917 and no charge of this kind was made or even remotely intended. However, because of possible similar misinterpretation by others, we shall gladly delete this paragraph from the paper, as it adds nothing to the scientific value of the latter.

One further misquotation should be noted. In the discussion of the use of various non-miscible oils for this purpose we mentioned the trial of several of these, citing the work of Eckles on fat-saturated amyl alcohol. Of all of the liquids tried, we found that amyl alcohol so prepared was the only one that did not cause a change in readings and we so stated but, far from recommending the use of this liquid, we stated various objections to it and finally concluded that the use of *all* such fluids should be abandoned. Professor Gregory has cited an experiment in which amyl alcohol lowered the fat reading after standing ten minutes but in this experiment, according to his own oral statement, he omitted the very important detail of first saturating the alcohol with butter fat. The conclusion seems fairly obvious. The advance abstract of our paper did not mention this point but, as already noted, an abstract can not go into experimental details.

We understand that quite lately the laboratory in which our observations were made has begun the use of a much lighter hydrocarbon oil than the one formerly used. We do not know whether this has diminished the error but we think it quite likely. If so, we have here another variable, in the variation in specific gravity and viscosity of the oils in general use for the purpose, where limits are not specified for these properties.

In conclusion, we do not believe that this, or any other scientific question, can be settled by denials or display of feeling, but that the laboratory is the only place where a decision can be reached and we offer, as the simple solution of the matter, that each one who is interested shall try the two methods of adding glymol, making observations for himself. We have no doubt that evidence will be found both for and against our conclusions *because the essential defect of the glymol method lies in its variable possibility of error.* But if our statements are "incorrect truths," polemics will not

be required to prove them so. Laboratory experiments are far more reliable.

E. G. MAHIN,
R. H. CARR
PURDUE UNIVERSITY

NOTE ON A DAYLIGHT METEORITE

THINKING that it might be of interest to readers of these columns, the writer calls attention to the following phenomenon observed by him while traveling by canoe on Lake Kipawa, Quebec, on August 31 last.

The day was particularly bright and cloudless, with a southerly wind blowing at about eight miles an hour. The time of the observation was 9:50 a. m., and the course of the canoe was almost directly south. The meteorite was suddenly seen to shoot across the course of the canoe from east to west, about 50° above the horizon, and, as far as could be judged, between 200 and 300 feet above the surface of the lake. Its passage lasted approximately three seconds from the time that it was first noted a little to the left of the bow of the canoe. The general impression received was that of a brilliant Roman candle shooting across the sky, of a vivid copper-green color. The size of the incandescent head of the body appeared to be a trifle larger than a golf ball with a bright incandescent streamer of nearly three feet in length behind it and of a like color. In the wake of the body trailed a curling wreath of white vapor of considerable length which became quickly dissipated.

The passage of the meteorite was accompanied by no detectable noise whatever, so that the other occupant of the canoe, whose gaze was directed elsewhere at the time, failed to see the occurrence. The body suddenly vanished about a hundred yards to the west about the original altitude, leaving a small cloud of white vapor behind that dissolved rapidly away. Although watch was kept on the surface of the lake beyond, no trace of a body falling into the water was noted. It is possible that either it was completely combusted at that moment, or it passed out of sight rapidly along its westerly course.

NORMAN MACL. HARRIS
DEPARTMENT OF HEALTH OF CANADA,
OTTAWA, ONTARIO

HOWARD ON CHEMICAL SPELLING

O Leland tell me, tell me true,
The explanation's up to you,
Why did you break the portals down
And jump into the Chemist's town?
But wait a minute: Now I see,
To solve the riddle's up to me;
You still are in your own domain
Where you without a rival reign,
For as the fact appears to me
You're trying to catch that spelling bee.

H. W. WILEY

QUOTATIONS

"BAYER 205"

A CURIOUS illustration of the German desire, not unnatural in itself, to regain the tropical colonies lost by the folly of the rulers of the German Empire, is afforded by a discussion which took place at a meeting of the German Association of Tropical Medicine at Hamburg. We have not seen a full report of the meeting, but the *Times* correspondent in Hamburg reports that one of the speakers said that "Bayer 205 is the key to tropical Africa, and consequently the key to all the colonies. The German government must, therefore, be required to safeguard this discovery for Germany. Its value is such that any privilege of a share in it granted to other nations must be made conditional upon the restoration to Germany of her colonial empire." Some account of the drug manufactured by the Bayerische Farbwerke and provisionally named "205" was given in our issue of May 20 (p. 807), when we quoted Dr. H. H. Dale's opinion that it was a remarkable curative agent in trypanosome infections. A general account of the probable chemical relationship of "205" is given by Dr. King in the sixth Annual Report of the Society of Chemical Industry (1921).

In 1904 Ehrlich and Shiga discovered the trypanocidal action of trypan red, a compound formed by combining one molecule of tetrazotized benzidine-mono-sulfonic acid with two molecules of sodium naphthylamine disulfonate. In 1906 Mesnil and Nicolle[1] investigated a series of dyes containing amino-naph-

[1] *Ann. Institt. Pasteur*, 417 and 518, xx, 1906.