sity of St. Petersburg, and later, director of the meteorological observatory there. His meteorological work which was very comprehensive centered most, perhaps, on the relations between the temperatures of air, ground, oceans and lakes. In 1904, Voeikov published "Meteorologia," a handbook of 719 pages in Russian, and at present the leading meteorological text in that language. As a geographer, he is noted particularly for his publications on the rôle of the Pacific Ocean in the world's affairs, an article on the regeneration of Russia, and a French work "Le Turkestan russe." [14]

NOTES

Prince Boris Borisovitch Galitzine died at Petrograd, after a short illness, on May 4 (17), of this year, at the age of 54 years. For the past three years he was director of the meteorological service of the Russian Empire. He is best known for his distinguished work in seismology.[15]

Sir William Ramsay, "the father of the new physical chemistry," and England's foremost chemist, died July 24, 1916. His contribution to meteorology, conjointly with Lord Rayleigh, was the discovery of the four noble atmospheric gases: argon, neon, krypton and xenon. Nitrogen derived from air was found to be denser than that obtained from other sources. By heating atmospheric nitrogen repeatedly with metallic magnesium Ramsay obtained a denser and denser gas which proved to be quite different from nitrogen. At the same time, Lord Rayleigh was able to separate nitrogen from possible impurities by repeating with modern apparatus an experiment devised by Cavendish. These two investigators continuing jointly discovered argon, first of a new class of elements. Incidental experimenting with liquid air led to the discovery of three other elements of this same type—neon, krypton and xenon.[16]

[14] See *Monthly Weather Rev.*, May, 1916, pp. 288–289.

[15] See *Nature, London*, Vol. XCVII., 1916, p. 424.

[16] *Scientific American*, August 5, 1916, p. 117.

Early this year Dr. Th. Hesselberg became director of L'Institut meteorologique de Norvege, Kristiania.

German meteorological magazines dated February, 1915, seem to have been the last ones received in this country.

Charles F. Brooks

Yale University

SPECIAL ARTICLES

THE BROMINE CONTENT OF PUGET SOUND NEREOCYSTIS (GIANT KELP)

It seems strange indeed that scarcely any mention is made in the American technical literature of the presence of bromine in the seaweeds of the Pacific coast, especially those seaweeds which have been termed "kelp." Available analytical data on the quantities of bromine from the above source is negligible.

The writer considers this to be due to one or more of several possible reasons. Perhaps, if bromine has been previously detected, it was not considered to be present in quantities large enough to be of importance. The content of bromine must vary considerably in amount in the various varieties and species of seaweeds. Either it does not occur in certain species or varieties, or the same variety from different localities contains it in widely different proportions. Again, the difficulty met with in determining bromine quantitatively in the presence of an excess of the other haloid salts is a contending factor in the production of analytical data upon this subject.

A personal experience, which attracted my attention to the bromine content of seaweed, may prove interesting at this point. Some two years ago, while teaching chemistry in the College of Puget Sound, Tacoma, Wash., it was my privilege to often walk along the beach at The Narrows, especially during the time of low tide. The Narrows is situated about four miles west of the city of Tacoma, and borders the mainland on the west and a strip of beach, known as Day Island, on the east. The channel of the sound is less than a half-mile wide

at this place and hence receives the full wash of the Sound's waters from each tide. The numerous quantities of igneous rocks in the channel and the rapidly moving water makes this location an ideal "field" for the growing of *Nereocystis luetkeana*. At low tide the beach is strewn with seaweed along with a few other, but smaller, varieties.

The stems and leaves are covered with a slimy coating from one sixteenth to one eighth of an inch in depth, and composed of algæ and other microorganisms. This covering acts as a protective coating to the seaweed while it lies exposed to the sun's radiations during low tide. Many of the leaves, twelve to twenty feet long and sixteen to twenty inches in width, develop light yellow spots with a filmy texture sometimes covering large portions of the leaves. The chlorophyl disappears entirely from these spots and does not apparently reappear as such upon submergence during the incoming tide. Upon close examination it is found that the slimy covering mentioned above has dried completely over the bleached spots, and in many instances there is none of the dried film present, suggesting that the slimy covering had been removed mechanically by wave motion, etc.

One would be at a loss to explain this discoloration of green coloring-matter in the seaweeds was it not for the strong odor of bromine in the vicinity where this bleaching was in progress, especially after the sun had radiated upon the beached plants for an hour or more. The "stench" of the fumes as being due to bromine is unmistakable to those who are at all familiar with the element. The presence of the bromine in the air about these localities must be due to the action of photo-chemical or microorganic processes upon the combined bromine and other halogens present in the seaweed. The liberation of small amounts of the halogens in the presence of the chlorophyl undoubtedly causes its discoloration.

In order that it might be determined whether or not the bromine existed in combination within the seaweed, several large *Nereocystis* (stems and leaves intact) were secured, washed, dried and ashed. The ashes gave a strong test for both bromine and iodine.

From the qualitative test one would expect the quantity of bromine to be equal to, if not greater than, the iodine content in the same ash. The ashes from *Nereocystis* secured at different times were kept on hand and given to the students for analytical determinations, viz., sodium, potassium, chlorine, bromine and iodine.

Two large *Nereocystis luetkeana* yielded upon quantitative examination the following substances expressed in per cent. of dry weight of material:

	K_2O, Per Cent.	I, Per Cent.	Br, Per Cent.
No. 1	22.3	0.30	0.19
No. 2	24.7	0.23	0.11

Though not going into detail as to the methods used in analysis (a detailed analysis will be reported in one of the chemical journals) I might say that standard procedures were followed.

It appears that the bromine should be both recoverable and merchantable in view of the present prices of this commodity.

HARPER F. ZOLLER

KANSAS STATE AGRICULTURAL COLLEGE,
MANHATTAN, KANS.

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE North Carolina Academy of Science met in annual session at the Agricultural and Mechanical College, Raleigh, on Friday and Saturday, April 28 and 29, 1916. The executive committee had a meeting on Friday afternoon, and after this there was a session for the reading of papers. At night President D. H. Hill, of the college, delivered an address of welcome and then President A. S. Wheeler, of the academy, gave his presidential address, "The Critical Dyestuff Situation," with a demonstration of materials. Next Professor E. W. Gudger read a paper entitled, "The Remora or Echeneis; A Living Fish-hook," illustrated with specimens and photographs.