brane of a gland are oppositely charged. Under such circumstances positively charged water particles will be driven in the direction from the positive to the negative side of the membrane. As soon as the positively charged water particle reaches the negative side of the membrane it gives off its charge. This enables other positively charged water particles to follow.

Ideas similar to those offered by Girard and by Bernstein have been expressed by way of explanation of other cases of abnormal osmosis by Bartell and his collaborators, and by Freundlich.

Whatever the ultimate theory of the driving force in these cases may be, we have a right to state that the electrification of the particles of water migrating through a membrane is a fact; that the sign of this electrification seems to depend on the chemical nature of the membrane in contact with water; that the rate of migration of these charged particles of water through the membrane from the side of pure water to the side of the solution is accelerated by the ions of the opposite sign of charge and retarded by the ions with the same sign of charge as that of the water with a force increasing with the valency of the ion; and that the relative acceleration and retarding effects of the two oppositely charged ions on the rate of diffusion of electrified water are not the same for all concentrations, that in lower concentrations of electrolytes the accelerating action of the oppositely charged ion increases at first more rapidly than the retarding effect of the other ion; while for higher concentrations the reverse is the case, until finally a concentration of the electrolyte is reached where the effects of the oppositely charged ions more nearly balance each other.

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HENRY ANDREWS BUMSTEAD

My personal acquaintance with Henry A. Bumstead dates from a meeting of the British Association in Winnipeg in the summer of 1909. He had studied in Cambridge, England, where his engaging personality, keen intelligence, and unusual *savoir faire* had made him a place in the hearts and homes of English scientists which has been held by few Americans. I was then almost unknown both to him and to them, but I soon learned that if Bumstead was in any gathering I should at once feel at home.

I was walking with him one day through one of the busy streets of Winnipeg when he asked if I would not step into a shop with him while he bought a little memento for Mrs. Bumstead, a "bad habit" which he said he had formed on trips away from home.

I mention these two trivial incidents because they reveal the soul and heart of the man; and what, after all, is either science or art in comparison?

When in 1917 the important and difficult post of scientific attaché in London was created, Bumstead was the only man considered, for no scientist in this country had his tact, his judgment, his knowledge of England, and his ability to assist in bringing about what was then, and what is now, the most important need of the modern world, namely, the cooperation and mutual understanding of the two great branches of the Anglo-Saxon race.

Bumstead's success in London was extraordinary. The British liked and trusted him. Admiral Sims and our own War Department placed large responsibilities upon him, and his office became the center of a very active and very important service. Young American officers who went abroad on scientific missions found him the center of their contacts and the prime source of their usefulness. They all became his devoted admirers. Not one or two but a dozen or more of both British and American officers who came to Washington during the war told me that they owed their success in their work in England and the continent primarily to Bumstead, and counted it the most valuable part of their experience that they had had an opportunity to become acquainted with him. One of these officers de-

scribed him as the most influential American in England.

As chairman of the National Research Council, as member of the National Research Fellowship Board, and as participant in other important groups with which he was associated at the time of his death, Bumstead showed the same broad outlook, the same big human interest, the same tact, the same sane intelligence and sound judgment which had characterized his work in England.

He spent practically the whole of the holiday week at my home in attendance upon the meetings of the Physical Society and of various committees of which he was a member. He was apparently in the best of health and spirits. Indeed, he spent Friday morning, December 31, going over with me the research work of the Ryerson Laboratory, and as we chatted together before he left about future plans he remarked that since his last operation some four years ago he had been feeling in excellent condition. He left me at about 11:30, intending to take the afternoon train for Washington. The next morning Dr. Vernon Kellogg, who occupied the berth opposite him, attempted to awaken him and found that he had gone.

He leaves a big gap in the ranks of American physicists. Born just fifty-one years ago in Pekin, Illinois, and educated in the public schools of Decatur, from which he went first to Johns Hopkins and then to Yale, he had done honor to the state which gave to this country Lincoln and Grant. He had been president of the American Physical Society, director of the Sloane Physical Laboratory since 1906, a very influential member of the Yale faculty, a member of the National Academy of Sciences, and a fellow of the American Academy of Arts and Sciences. He had a brilliant analytical mind, profound scholarship, exceptional critical capacity, excellent judgment, an extraordinary winsome personality, the finest culture, and a great heart. His personal scientific contributions were important, though they had been much interferred with by his none too rugged health. His effect upon American physics, however, was not limited to his own scientific papers, but he exerted a powerful influence upon his pupils and upon his fellow physicists.

It is not merely American science, however, which can ill afford to lose him twenty years before his time. American life in all its aspects is sadly in need of men of Bumstead's type. The cause of sanity, of culture, of Anglo-Saxon solidarity, of scholarship, of science, of world civilization, all suffer irreparably through his death. R. A. MILLIKAN

SCIENTIFIC EVENTS

POLAR RESEARCH

The Christian Science Monitor reports that the Ambassador of the United States in London, Mr. John W. Davis, visited the meeting of the Royal Geographical Society held at the close of the year to discharge a pleasant duty with which he had been intrusted by the American Geographical Society of New York. When the centenary of the birth of David Livingston was celebrated in 1913, the Hispanic Society of America founded a gold medal for exploration and placed it at the disposal of the American Geographical Society. It is one of the highest awards in the geographical world, and its latest recipient is Dr. W. S. Bruce, who has devoted his life to the extension of knowledge of the Arctic and Antarctic regions. This medal was presented by Mr. Davis. In the unavoidable absence of Dr. Bruce the medal was received on his behalf by Dr. R. N. Rudmose Brown, who has served under Dr. Bruce in both the north and the south polar regions. The ceremony emphasized the close interest which the American and English peoples have taken in popular research. Mr. Davis, in making the presentation, expressed his satisfaction that the American Geographical Society had not imposed any narrow confines on their choice of a recipient; and Dr. Rudmose Brown, in returning thanks, said that Dr. Bruce's gratification at receiving the medal would be increased by the thought that it had been adjudged to him by the countrymen of such explorers as Wilkes and Greely.