ern China. For years the biologists in China have been exploring different parts of the coast to decide where such a station could best be placed. The north China coast is singularly poor faunistically. Here at Amoy the marine fauna is rich and various, a transition region between the Palearctic and oriental forms. There are sandy beaches, mud flats and rocky islands, and near here is the famous amphioxus fishing ground where amphioxus is caught by the ton and sold for food at four cents gold a pound.

Amoy has a university situated directly on the coast, with a modern well-equipped biology laboratory building. Dr. T. Y. Chen (one of Professor T. H. Morgan's students), who is now professor of zoology at Amoy University, with the cooperation of President Lim Boon-Keng, a university president with a real interest in scientific development, and the financial assistance of the China Foundation for the Promotion of Education and Culture, of which Mr. H. C. Zen is chairman, has opened the Amoy Biological Laboratory for summer research work and invited a group of about twenty-five biologists as guests the past summer, to initiate a China Marine Laboratory. The group has the usual international character of every science gathering in China—Chinese, American, British and German. We have been most hospitably entertained by the university, living in the buildings and eating at a common mess. Fifteen institutions are represented: Northeastern University in Mukden, Yenching University and Peking Union Medical College in Peking, Ginling College in Nanking, Soochow University, Shanghai College and Chi-Nan University in Shanghai, Hangchow College, Nanchang Academy, Fukien Christian University in Foochow, Amoy University and Anglo-Chinese College in Amoy, Lingnan University and Sun Yat Sen University in Canton, and the University of Washington in Seattle.

The research has been of several types, faunistic, experimental and cytological, concentrating on living amphioxus, but including also Teredo, Squilla, fishes, amphibia, insects, protozoa. The actual results of this first summer may not be great, but it is a beginning.

Dr. Chen is starting a supply service to furnish Chinese marine forms to the laboratories of China. This ought to be a good supplement to the world supply of amphioxus.

This whole venture is an instance of President Lim's scientific enthusiasm and one more of the far-sighted ways in which the China Foundation is encouraging science development in China. Biologists on sabbatical trips around the world ought to stop at Amoy. It lies half way between Shanghai and Hong Kong and can be reached by coast steamer from either port.

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QUOTATIONS

WARD'S NATURAL SCIENCE ESTABLISHMENT

THE cradle of taxidermy in this country was destroyed when Ward's Natural Science Establishment in Rochester, with its irreplaceable collections, went up in smoke. Many a man who later became famous as a naturalist started his career as an apprentice at Ward's, stuffing birds and fishes and four-legged beasts. One of them, the late Carl Akeley, walked through the jaws of the sperm whale at the entrance when a youth of 19 and gleefully accepted a job at $3.50 a week, although the cheapest board and lodging he could find in Rochester cost him half a dollar more. His book, "In Brightest Africa," contains a list of some of the young enthusiasts he knew there or who preceded him—E. N. Gueret, George K. Cherrie, J. William Critchley, H. C. Denslow, William T. Hornaday, Henry L. Ward, Frederick S. Webster, Frederic A. Lucas, William Morton Wheeler. The roster reads like a page from a naturalist's Who's Who.

Taxidermy in those days was rather a trade than an art. The skin of an animal was first treated with salt, alum and arsenical soap. After the bones had been wired and put in there was nothing more to do but hang the body upside down and stuff it with straw until it would hold no more. No attempt was made to put the animal in a natural attitude. The reason for this crude work, Akeley explains, was not that Professor Ward and his assistants knew no better, but that nobody would pay for better work. The museums for which the establishment prepared specimens cared more for purely scientific data than for exhibitions that would interest the public. They had no taxidermists of their own and generally preferred collections of skins and skeletons to mounted groups. Ward's men would tackle anything from a humming bird to an elephant. Their largest job was the stuffing of Barnum's mighty Jumbo. The mounted skin of this most famous of pachyderms is at Tufts College; its skeleton is in the American Museum of Natural History in this city.

For the present artistic perfection and scientific accuracy of taxidermy Akeley deserves a great share of the credit. He invented many new methods. He was one of the first to realize the importance of a knowledge of animal anatomy, and his natural bent for sculpture gave an artistic quality to all his work. The modern taxidermist, instead of stuffing the skin of an animal with straw and rags, mounts it on a waterproof manikin made whenever possible from a plaster cast of the body. The animal is seldom placed on display without a stage setting suggesting its proper habitat. It is a far cry from the Ward's Natural Science Establishment of Akeley's youth to the great institution at Central Park West and Seventy-seventh Street, but in numerous respects Ward's led the way.—*The New York Sun.*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A METHOD FOR WORKING ON THE TERMINAL NERVE-MUSCLE UNIT

THE method here described[1] makes possible a direct experimental study of the terminal motor axone with its attached muscle fiber. Thus, in one field and focal plane with active circulation, an ultimate member of the motor-unit can be identified, operated upon and selectively stimulated under the compound microscope.

A technique employed by us for recording *in situ* by reflected light the mechanical response of muscle fibers in the retrolingual membrane (*membrana basihyoidea*) of the frog has recently been reported.[2] On noting in this structure the frequent presence of terminal nerve filaments (from *n. hypoglossus*) we have since met the requirement of transmitted light by a procedure similar to that devised by Richard Thoma for the observation of leucocyte migration and published at Heidelberg[3] in 1873. Both nerves and muscle fibers are mentioned by Thoma, who points out the many conditions fulfilled by the preparation in the study of living tissue elements.

The intrinsic lingual muscle fibers (*stratum arcuatum* Gaupp) which from either side enter this delicate membrane bounding dorsally the extended tongue form a transversely, somewhat sparsely disposed branching and anastomosing system. The fibers, though suggesting thus an interconducting syncytium, are nevertheless partitioned into discrete members each of which is of the striated-voluntary type. Since Thoma's observations these fibers have from time to time been an object of interest to workers on muscle structure and function, notably Ranvier[4] and Kahn,[5] and have come recently under special notice in a fruitful examination of the credentials of the all-or-none law.[6]

1 *Cf.* abstract, F. H. Pratt and M. A. Reid, *Proc.* Am. Physiol. Soc. (Chicago meeting, March 28–29, 1930); *Am. J. Physiol.*, 93: 681, 1930.

2 F. H. Pratt, *Am. J. Physiol.*, 93: 9, 1930.

3 Verlagsbuchhandl. v. Fr. Bassermann. Buchdruck., G. Otto, Darmstadt.

4 L. Ranvier, *Compt. Rend. Acad. Sci.*, 110: 504, 613, 1890.

5 R. H. Kahn, *Zentralbl. f. Physiol.*, 17: 745, 1903–04.

6 E. Fischl and R. H. Kahn, *Pfl. Arch.*, 219: 33, 1928; F. H. Pratt and M. A. Reid, *Proc.* XIII Int. Physiol. Cong., *Am. J. Physiol.*, 90: 480, 1929; S. Gelfan, *Am. J. Physiol.*, 93: 1, 650, 1930; H. Hintner, *Pfl. Arch.*, 224: 608, 1930; F. H. Pratt, *loc. cit.*

The *motor-unit*, a term introduced by Sherrington[7] to denote the nerve fiber with the muscle fibers governed by it, is known to be adapted in its pattern to the directional demands on the muscle in developing tension. Thus in the sartorius[8] the motor-unit is linear in disposition, involving formation in files of the "squad"[9] of muscle fibers under command of the neurone. This close formation of a group intimately bound into the muscular matrix offers little feasibility of detailed inspection *in vivo*. With the retrolingual membrane, however, the tension requirement is highly diffuse;[10] it is correlated with a dispersion or deployment of the muscle-squad in essentially one plane, the fibers being none the less completely integrated through the nerve strands passing along and across the intervals formed by the divergence and loose intertexture of the musculature (Fig. 2) as it invades the membrane from the arcuate layer. It should therefore be possible, with proper illumination and control, to take practical advantage of this natural isolation of what may be termed respectively a motor sub-unit (branch system subordinate to the motor-unit) and the motor-terminal (ultimate sub-unit—the innervated muscle fiber).

In Thoma's method[11] the everted tongue is stretched over a glass plate after an opening for transmission of light has been made in what is now the floor of the superficial lymph sac (*sinus basihyoideus*). This admits of continued circulation, the preparation being kept moist by irrigation. With the present modification, however, it is unnecessary to stretch the tissues since a glass disc or cylinder supports the membrane and fills the opening beneath it, with the further advantage that manipulation is afforded without deranging the focal position; as, for example, in the mechanical blocking of impulses in single nerve fibers. Even with extensive pithing the capillary circulation in the preparation may be highly active and persistent, all tissues under observation being immersed.

7 C. S. Sherrington, *Proc. Roy. Soc.* B, 105: 332, 1929; J. C. Eccles and C. S. Sherrington, *ibid.*, 106: 326, 1930.

8 S. Cooper, *J. Physiol.*, 67: 1, 1929.

9 E. L. Porter, *Am. J. Physiol.*, 91: 345, 1929.

10 R. H. Kahn, *loc. cit.*

11 R. Thoma (illustrated description), Abderhalden's Handb., V, 4, 1924, p. 1928.