tional to the amount of precipitate that had been formed. The supernatant from the plasmin treated with 1.6 μg of zinc showed the same activity as the untreated plasmin.

The experiment was repeated using homogenized egg albumin[2] as a substrate, and again it was found that 45 μg of ionized zinc was sufficient to precipitate 30 units of plasmin, so that no activity remained in the supernatant fluid.

A zinc chloride solution was prepared so that 1 ml again contained 45 μg of zinc, and this was also effective in completely precipitating or inactivating plasmin. The precipitate was redissolved by dialyzing it against tap water for 4 hr. Plasmin activity was demonstrated in this solution, although recovery was not complete. Dialysis of plasmin against tap water results in the loss of some plasmin activity.

The technique promises to be of value in the crystallization of this enzyme.

Reference

1. VALLÉE, B. L. *J. clin. Invest.*, 1948, **27**, 559.

[2] Courtesy of Otto Schales.

A Simple Technique for Observing Carotid and Brachial Artery Pulse

James W. Benjamin and Louis A. Susca

Department of Physiology and Pharmacology, New York Medical College, Flower and Fifth Avenue Hospitals, New York City

Various methods have been used in the laboratory for measurement and observation of the carotid pulse. In most cases the methods employed utilized various delicate pieces of apparatus, such as double membrane tambours and kymograph drums. In many cases irregular recordings of the carotid pulse are obtained because of inertia in the equipment used. Students rarely actually visualized the pulse they were studying.

A simple technique for visualizing the carotid pulse and the brachial pulse has been developed in this laboratory. The simple apparatus necessary, as shown in Fig. 1, consists of a test tube *A*, two graduated glass tubes (with a bore of about 1 mm) *B* and *C*, a three-holed rubber stopper, two pieces of rubber hose (about 18 in. long) *D* and *D′*, and two glass funnels *E* and *E′*. (Funnels are 1.5 in. in diameter at the mouth.) The test tube is almost completely filled with water *F*, and a few drops of methylene blue, neutral red, ink, or other coloring material are added to the water, so as to obtain a slightly colored solution. Each of the graduated glass tubes is inserted in one of the openings in the rubber stopper. The rubber stopper with tubes is inserted into the test tube. A piece of rubber hose is attached to each of the glass tubes. A funnel is then inserted into the free end of each piece of rubber hose.

When either funnel is pressed against the neck over the carotid artery, air in the tubular system is bubbled out

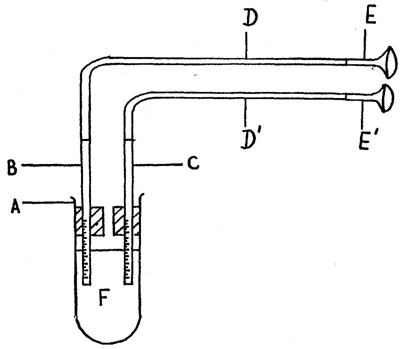

FIG. 1. Schematic drawing of apparatus used for observing carotid and brachial artery pulse.

at the submerged end. If a little more than sufficient pressure to detect carotid pulse is exerted, then slight release of pressure will draw fluid into the system to any desired height. When pressure is properly adjusted, the pulse will drive the air column through an excursion of several mm (as is noted on the graduated portions of the glass tubes).

The other funnel may be placed over the brachial artery near the bend of the elbow, and with somewhat greater pressure, the pulse in the brachial artery may be likewise observed.

If a 1-in. strip of old inner tube rubber approximately 18–24 in. long has a hole punched near its middle, through which the funnel stem is inserted, then the funnel can be held against the carotid by elastic tension, provided the tubing is drawn around the neck and fixed by means of a hemostat or clamp. A protecting roll of cloth at one side of the opposite carotid artery should be used to avoid decreased cranial flow, which may otherwise occur. It is possible that, when one funnel is thus fixed over the carotid artery, the same individual can hold the other funnel against the brachial artery. Thus the menisci of both pulse pressures can be obtained simultaneously and compared as to excursion and sequence.

Cretaceous Rocks in the Kamishak Bay Area, Cook Inlet, Alaska

John C. Hazzard, Joseph J. Bryan, Eugene Borax, and Richard Shoemaker

Union Oil Company of California, Los Angeles, and The Ohio Oil Company, Bakersfield, California

South of Kamishak Bay in the Kamishak Hills between the Kamishak and Douglas rivers, at least 2,000 feet of Cretaceous sediments rest with possible disconformity upon Upper Jurassic Naknek beds. The Cretaceous is predominantly greenish-gray, medium-grained silty current-bedded sandstone, similar in many respects to the underlying Jurassic. Near the base, bluish-gray concretionary limestone is present locally, but at other places the presumed base is marked by a thin pebble conglomerate, including well-rounded fragments of hornfels, volcanic rock, sandstone, granite, and fragmentary belemnites and buchias.

All fossil collections were studied by G. D. Hanna and Leo Hertlein. Middle Cretaceous fossils reported as *Lytoceras* sp., *Phylloceras* sp., and *Prionotropis* sp. were collected from the sea cliffs at the mouth of the Douglas River. Sea-cliff exposures a short distance west of the southernmost mouth of the Douglas yielded *Phylloceras* sp. Though assigned to undifferentiated Cretaceous, the latter beds are believed to be stratigraphically close to the base of the Cretaceous of the Kamishak Bay area; better collections might establish the presence of Lower Cretaceous. Collections made high in the Kamishak Hills about 7 miles southeast of the mouth of the Kamishak River include the following Upper Cretaceous genera: *Parapachydiscus, Phylloceras, Turrilites,* and *Inoceramus.*

Stratigraphic relations are uncertain between the Cretaceous at Kamishak Bay and the Lower (Albian) Cretaceous at Kaguyak, 30–35 miles south. At Kaguyak, Lower (Albian) Cretaceous fossils were collected a few hundred feet above the top of the Upper Jurassic Naknek formation.

Lower Cretaceous Rocks at Cape Kaguyak North of Kukak Bay, Alaska

John C. Hazzard

Union Oil Company of California, Los Angeles

Beds of Lower Cretaceous (Albian) age occur at Cape Kaguyak on the western side of Shelikof Strait about 17 miles north of Kukak Bay. Cape Kaguyak is a flat-topped promontory separated from the main coast to the west by a half-mile wide swampy sand flat. About 400 feet of beds comprising fossiliferous, concretionary, black limy siltstone with thin beds of dark bluish-gray limestone are exposed in the seacliffs on the cape and in the surrounding reefs. The presumed base of the Cretaceous is a 30-foot greenish-gray, fine-grained sandstone cropping out at the mainland edge of the sandflat west of the cape. The nature of the intervening section is unknown. The basal sandstone rests with apparent conformity on the Upper Jurassic Naknek formation. North of Cape Kaguyak along the coast west of Swikshak Lagoon a thick section of bedded rocks is exposed. Regional relations indicate that this section includes the Naknek formation at its base, overlain by beds correlative with those at Cape Kaguyak, and the section may extend upward into the Tertiary. Atwood reported Cretaceous rocks in this vicinity (*1*, Pl. VI).

S. W. Muller reports the following Lower Cretaceous (Albian) forms from Cape Kaguyak: *Cleoniceras* sp., *Hamites* several species, *Beudanticeras* sp., *Phylloceras* sp.

Correlation between the Kaguyak Cretaceous and the Middle and Upper Cretaceous in the Kamishak Bay region 30–35 miles north is uncertain. Lower Cretaceous rocks in the Alaska Peninsula are known at Herendeen Bay and Port Moller (*1*, Pl. VIII).

Reference

1. ATWOOD, W. W. *U. S. Geol. Survey Bull. 467,* 1911.

Measurement of Ion Migration on Paper in an Electric Field. Transference Numbers of Nickel and Copper Sulfates

Hugh J. McDonald, Matthew C. Urbin, and Martin B. Williamson

Department of Biochemistry, Stritch School of Medicine, Loyola University, Chicago

While studying the separation of various organic and inorganic compounds of biochemical interest, a method was devised which yielded good results in some cases, and appeared to be of great promise in others. As far as the authors are aware, the method described here has not been reported previously.[1] Essentially, it is based on electrophoresis, in which a strip of filter paper serves as a path along which ions or charged particles migrate under the influence of a potential gradient.

The apparatus is illustrated in Fig. 1. A strip of filter paper,[2] *P*, 35–50 cm in length, was supported in a glass tube 2.5 cm in diam by means of two glass pins, *B*, piercing the paper strip and passing into small holes in the rubber stoppers at each end of the tube. The electrode vessels, *A*, fitted with platinum-wire electrodes, were filled with 0.1 *N* KCl and connected by means of an agar saltbridge with the large buffer vessels, *D*. The ends of the paper strip were then permitted to become completely wetted with the KCl solution by wick

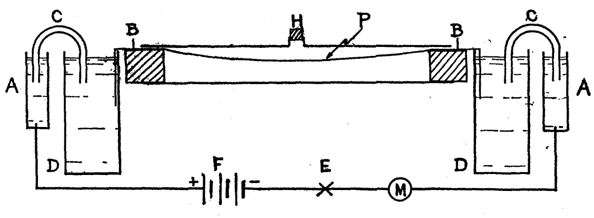

FIG. 1. Apparatus devised to study ion mobilities.

action. In certain experiments, particularly those with amino acids and proteins, solutions of electrolytes that acted as buffers were used to wet the paper strip. With the switch, *E*, closed, the circuit was completed. With a voltage of 135 v, provided by the batteries, *F*, a current of 1–3 ma was registered on the milliammeter, *M*.

Despite the superficial resemblance to paper chromatography, the method is basically electrophoretic in nature. Chromatographic processes depend on a distribution of some material between a mobile and a nonmobile phase. In the technique described, the separa-

[1] After this manuscript had been submitted for publication, an abstract by E. L. Durrum (*1*), which appears to embody some of the ideas of this paper, came to the attention of the authors.

[2] Eaton and Dikeman Paper No. 613 in rolled strip form, 8 mm wide.