such a film should be called "isokinetic." The rate of exposure in the camera should be marked clearly on the film to avoid confusion between the 16 frames per second used for silent films and the faster rate of 24 frames per second used with sound films. The latter more rapid rate is coming into use for silent films and may become ultimately the standard rate for "isokinetic" films.

Projecting the film at a slower rate than that at which it was taken retards the rate of motion and is the familiar slow motion picture. Slow motion is sometimes confused with stop motion or lapsed time films which are opposite in kind. Consequently, to avoid any misconception the term "bradykinetic" is proposed to denote any film to be projected at a slower rate than was used in making the film.

The three types of film are fundamentally different because the ultimate speed on the screen of the process photographed has to be decided before making the film and determines the camera speed. Much more film per minute is used in making "bradykinetic" films than with "tachykinetic" films. A "bradykinetic" film can not be obtained by projecting rapidly an "isokinetic" film, except within very narrow limits, because the intervals between exposures are too long, resulting in a blurred effect.

Therefore, the three terms herein proposed distinguish different kinds of motion picture film and give a uniform terminology which precludes confusion. The only other description required is a statement of the camera and projector speeds. The ratio of these speeds shows how much, if any, the actual time relations are altered. The rates are usually constant for a given film, but they need not be constant, as varying the rates gives a new relative time that may be very useful to the investigator. The relation of this varying time to the original time can be obtained from the acceleration (or retardation) of both the camera and the projector.

Oscar W. Richards

Osborn Zoological Laboratory
Yale University

A REVIEW OF EVIDENCE RELATING TO THE STATUS OF THE PROBLEM OF ANTIQUITY OF MAN IN FLORIDA[1]

Investigations by Sellards, Gidley and others have presented evidence suggesting the association of human remains with those of a Pleistocene fauna in the Florida coast region. The area in which this interesting occurrence was noted has been studied carefully by many anthropologists, archeologists, geologists and paleontologists, with the result that sharply differing opinions have developed regarding the meaning of these materials.

The classic localities for these finds of ancient human remains at Vero and Melbourne in Florida were examined by the writer in 1932. At that time it was possible to visit the exact points at which some of the most important specimens had been secured, under guidance of Frank Ayers, who had been associated with the original discoveries. These localities were visited again in 1935 in company with Edgar B. Howard, of the University of Pennsylvania Museum.

In making a study of the localities at which ancient human remains were found in Florida it was the purpose of the writer to determine, if possible, whether the association of extinct faunas and human remains suggested an association or sequence comparable to what has been found in southwestern United States. On the visit in 1932 and again in 1935 the impression obtained was that, at the localities visited, the occurrence of remains of certain extinct animals considered to represent a Pleistocene fauna suggests the type of association known in the Southwest, where human relics appear with a fauna now, at least in large part, extinct. Whether this means that man was present in Florida in Pleistocene time or whether animals now extinct lived in that region in what may be called early Recent time, will be determined by more intensive studies of the stratigraphy, physiography and paleontology of this region than have yet been made.

John C. Merriam

Carnegie Institution
Washington, D. C.

QUOTATIONS

THE FOREST SERVICE

Another attempt is under way to get the national forests and the forest work of the government transferred from the Agricultural Department, where the forests are safe and the work well done, back to the Department of the Interior, from which they were taken because of wretched management.

The present attempt is made under cover of an effort (Senate Bill 2665) to change the name of the Interior Department to the Department of Conservation and Public Works. The transfer of the national forests and the Forest Service is not mentioned in the bill, but is planned for later on.

Conservation is too broad a subject to be confined to any one department. Nearly all of them deal with

[1] Abstract.

it in one form or another. A Department of Conservation would be almost as illogical as a department of typewriting or a department of wastebaskets, which everybody has to use.

The conservation policy itself, and about every important conservation movement for the last thirty years, originated in the Department of Agriculture. It has shown practical horse sense in dealing with natural resources intelligently, uprightly and without fraud or loss.

In contrast, the record of the Interior Department is far and away the worst in Washington. Every natural resource, without exception, that has been held for disposal by the Interior Department—public lands, Indian lands, coal, oil, water power and timber—has been wasted and squandered at one time or another. It is one long story of fraud in public lands, theft in Indian lands and throwing the people's property away.

Most of the fights for conservation have been made to save natural resources belonging to the people which the Interior Department was throwing away. The national forests must not go the same road.

Secretary of the Interior Ickes is sincere and honest, but he cannot live forever. Secretary Garfield was honest, but Secretary Ballinger, his successor, tried to give away the people's water powers and the coal lands in Alaska. The resulting scandal cost Taft his reelection. And everybody remembers Teapot Dome, when Secretary Fall handed the navy's oil lands over to the despoilers. Fall tried hard to get his hands on the national forests.

Ickes is my friend, Wallace is my friend. But the national forests could not be better handled in the Interior Department than in the Department of Agriculture, where they have been safe for thirty years. What is the use of rocking the boat?

The Forest Service is completely free from politics where it is. Ickes himself is straight, but the whole history of the Interior Department is reeking with politics. The tradition of the Interior Department is to put private interests first. The tradition of the Agricultural Department is to put public interests first.

Wood is a crop. Forestry is tree farming. It belongs in the Department of Agriculture with all other farming and production from the soil.

Undoubtedly if Secretary Ickes got the national forests he would do his level best. But he has more work now than any other cabinet officer in Washington. The national forests are bigger than all the Atlantic States, from Maine to Virginia inclusive. Why put this additional load on a man who has too much to do already? Let the national forests stay where they are.—*Gifford Pinchot, former governor of Pennsylvania, forester, U. S. Department of Agriculture, 1896 to 1910, in The New York Times.*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

CONSTRUCTION OF A CARTESIAN NOMOGRAM FOR THE LAW OF MASS ACTION

GIVEN the equations

$$(1)\quad [\text{Total A}]^{*} = [\text{A}] + [\text{AB}]$$

$$(2)\quad [\text{Total B}] = [\text{B}] + [\text{AB}]$$

and the mass action equation

$$(3)\quad \frac{[\text{A}] \times [\text{B}]}{[\text{AB}]} = \text{K}$$

it is often required to calculate values for [A] or [B] from values for [Total A] and [Total B]. This is most conveniently done with the aid of a Cartesian nomogram, of which the abscissas and ordinates represent [Total A] and [Total B], respectively, and on which [A] or [B], or both, appear as families of curves, each value for [A] or [B] being represented by a straight line.

The general equations for such a nomogram, as obtained from Equations 1 to 3, are

$$(4)\quad [\text{Total A}] = \frac{[\text{A}] \times [\text{Total B}]}{\text{K} + [\text{A}]} + [\text{A}]$$

$$(5)\quad [\text{Total B}] = \frac{[\text{B}] \times [\text{Total A}]}{\text{K} + [\text{B}]} + [\text{B}]$$

Construction of the nomogram from these equations offers no difficulties, but can be still further simplified.

From Equation 3, when [A] = [AB], [B] = K, and when [A] = [AB] = [B] = K, [Total A] = [Total B] = 2 K. It follows that a straight line passing through the points [Total B] = K, [Total A] = 0, and [Total A] = [Total B] = 2 K, represents all points at which [A] = [AB] and therefore at which [Total A] = 2 [A]. If this line is drawn the desired points for $[\text{A}] = \frac{[\text{Total A}]}{2}$ may be located upon it and connected by straight lines with the corresponding points for [A] = [Total A], [Total B] = 0. Figure 1 illustrates the construction of the nomogram by this method. If desired the iso-[B] lines may be located by the same method.

When the value for K is small, graphic extrapolation of the line representing the points [Total A] = 2 [A], and of the iso-[A] lines passing through points located upon it, may be inaccurate. In such a case a line further removed from the [Total A] axis, includ-

* The brackets [ ] indicate concentrations, in moles per liter.