during the period of growth, the effects upon later life were very pronounced and showed that a liberal intake of vitamin A has a most important bearing upon the length of life and upon the general stamina of the adult as reflected in ability to resist disease and to produce and rear healthy offspring.

Thus our growing knowledge of vitamin A gives it a meaning very much broader than merely that of a substance which prevents an eye disease. While the relation to ophthalmia is well worth remembering, yet there now seems certainly to be a still greater significance in the effects of vitamin A in increasing resistance to respiratory disease and in contributing to the condition of general health and vigor, both in the individual and in successive generations.

To suggest the habitual use of any such term as "antiophthalmic vitamin" or "ophthalamin" seems, therefore, probably to put the emphasis in the wrong place, and certainly to be unfortunate in that it diverts attention to but a small part of the true meaning of vitamin A.

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## THE SIEVE OF ERATOSTHENES

IN SCIENCE for September 21 (p. 273) a writer directs attention to the alleged "widespread error" of attributing to Eratosthenes the "sieve" for finding all the prime numbers which do not exceed a given number. The writer claims that the method was known long before the time of Eratosthenes, but does not state on what evidence his statement rests. He simply gives the information as a well-established fact and directs the reader to E. Hoppe's "Mathematik und Astronomie," 1911, p. 284. Consulting Hoppe one meets with the statement that the method is found in Plato's "Phaedo," chap. 52, and that Plato also proved the number of primes to be infinite, a proof usually ascribed to Euclid. *If true,* these statements are important and deserve to be published in a widely read periodical like SCIENCE. But are they true?

Hoppe's statement has not been fully accepted by any historian of mathematics. Plato in "Phaedo" speaks of hot and cold, fire and snow, as necessarily excluding each other. Likewise the idea of odd and the idea of three and of five are opposite to the idea of even and of two. They reciprocally exclude each other, as indeed do the immortal soul and death. This is not the place for extensive quotation from Plato. It is sufficient to say that it is not clear that Plato considers here prime numbers at all, as a class. The late G. Eneström, the very ablest recent critic in the field of mathematical history, printed in his journal a review by G. Junge who expresses himself on this matter as follows ("Bibliotheca mathematica," XII, 1911–1912, p. 356): "Mr. Hoppe is not at his best when he purports to discover in Plato's writings all sorts of mathematical results which no one before him has yet found in them and which probably no one will find in them again. Thus he claims (p. 284) that the sieve method of Eratosthenes is 'already fully developed by Plato' and that the theorem that the number of primes is infinite is found in Plato." No further comment on our part is necessary.

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## THE PROBABLE USEFULNESS OF BLOOD-GROUPING TESTS IN ESTABLISHING NON-PATERNITY

IN connection with bastardy proceedings it is desirable that the defendant may know the chances of establishing his innocence by comparing his isohemagglutination group with that of the mother and of the alleged offspring.

We have calculated the probabilities which obtain among the white population of the United States. Details of the method will shortly be published elsewhere. The results, based upon the inheritance hypothesis of Bernstein, are as follows:

PROBABILITIES OF ESTABLISHING NON-PATERNITY WHEN ONLY THE WRONGFULLY ACCUSED MAN'S BLOOD GROUP IS KNOWN

| Landsteiner | Group Jansky | Moss | Probabilities |
|---|---|---|---|
| 0 | 1 | 4 | 1/5 |
| A | 2 | 2 | 1/17 |
| B | 3 | 3 | 1/7 |
| AB | 4 | 1 | 1/2 |
| Unknown | | | 1/7 |

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## PRESSURE PHENOMENA IN THE DIVIDING CELL

MOTION photography reveals phenomena which do not register upon the physiological eye. Just as the microscope alters space dimensions, so may the motion camera accommodate time dimensions to a scale of normal interpretation, and thereby draw closer the relation of morphology to physiology. Evidence has, for example, been obtained by this instrument, which demonstrates the existence of defi-

nite protoplasmic pressure fluctuations during the process of cell division.

A film portraying the life cycle of the oyster contains a stop motion scene illustrating the first stages of cell division. A minute perforation in the cell wall of the egg permitted some of the protoplasm to protrude. Ordinarily such a punctured egg would not attract attention, and this one would have been discarded had it been detected in time. The camera, however, went on recording the remarkable behavior of this indicator of what development of the print revealed to be unmistakable pressure pulsations.

The gradual change in form at the moment of cell division unnoticeable to the eye becomes in the accommodated time of the film a vigorous squirming of escaping protoplasm, indicating a marked internal pressure. A more astonishing effect immediately follows the completion of cell division, when as though by violent suction the protoplasm disappears again within the cell wall. The phenomenon is repeated at each succeeding active phase of cell division, though gradually weakening until obscured by the progressive disintegration.

A more detailed illustrated description is being prepared and arrangements are being made to show the film at the New York meeting of the American Association for the Advancement of Science.

WM. FIRTH WELLS

## HAIRY MAMMOTH SKELETON IN UTAH

GRAVEL workers at the gravel pits two and one half miles east of Payson, Utah, on September 17, uncovered a partial skeleton of what appears to be an ancient hairy mammoth (*Elephas primigenius*). Excavations were immediately placed under the supervision of the author, and have resulted in the recovering of two well-preserved spirally curved tusks, two teeth, two legs with feet intact, a lower jaw bone and a number of rib bones.

The left tusk is six feet long, outside measurement, and three feet nine inches measured from tip to base, fourteen inches in circumference and ends with a sharp tip. The right tusk is five feet five inches long, outside measurement, and three feet four inches from base to tip, fourteen inches in circumference at base and six inches at tip.

The right tusk has been worn off farther than the left, perhaps because of its use in digging through life. Present-day African elephants almost invariably have their right tusk worn down shorter than the left by their industrious digging.

The teeth are moderate in size, one being found intact in the lower jaw, which is perfect in form, has fourteen well-developed dental plates, thin and fine in texture, placed at a moderate distance apart and firmly cemented together. The other tooth is an upper, reasonably well preserved but lacking in completeness.

A complete skeleton was not to be found, which of course is the usual case with finds of this sort where the individuals are entrapped in terrace gravels or delta deposits. The parts recovered were enclosed in a thin bed of fine clay fifteen feet below the surface of the terrace gravels of what is termed the Provo stage of the ancient Lake Bonneville. The parts of the skeleton that projected either into the almost blood-red gravels above or the coarse grain sands below the shale suffered complete oxidation and were not to be found.

Geologically this find is of late Pleistocene in age (estimated thirty thousand years), and locally dates back to a time when Lake Bonneville covered the greater part of western Utah to a depth of perhaps one thousand feet in places.

This represents the second find to be made near the town of Payson during the past few weeks. On September 7, the hind leg of another individual (measuring six and one half feet) was obtained at a gravel pit two miles to the west.

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## QUOTATIONS

### INTERNATIONAL CONGRESSES[1]

(ABSTRACT of a paper by Dr. J. E. Baron de Vos van Steenwijk, in the *Haagsch Maandblad,* translated for the announcement of the Fourth Pacific Science Congress to be held in Java in May, 1929.)

Opinions concerning the use of congresses are widely divided. The reason for this seems to be that their use is not general, but personal, *i.e.,* that not science itself reaps so much benefit, but rather the scientists themselves who attend the congress and come in personal contact with colleagues from afar. It is true that not every one is able to assimilate all the good that can accrue from such meetings; some people are quite at ease in the turmoil of a congress while others do not feel at home and remain unsatisfied. The latter are afterwards apt to criticize sharply.

In my opinion the success of a congress can not be judged by the apparent results; and certainly not by the motions and resolutions that have been passed by it but which never come into force. At a congress to be attended by several hundred persons, good work

[1] Copied with kind permission of the editorial staff of the *H. M.*