

various ether vapors at 100° C. were obtained by the well-known transpiration method. In the apparatus used the capillary was perfectly straight and the driving pressure obtained by a column of mercury descending under gravity. The most interesting substances examined were eight ethers, some of them extremely rare, divided into three groups of isomers. The results show the same fact for these propyl compounds that was observed by Lothar Meyer¹ and Steudel for butyl compounds, viz., the molecules of a tertiary compound are smaller than those of a secondary, which in turn are smaller than those of a primary.

William Campbell read a paper on the iron carbon series of alloys. The various published equilibrium curves of the series, by Roberts-Austen, Rooseboom, Le Chatelier, Benedicks and others, were reviewed. A series of lantern slides showed the various changes of structure which take place (a) by variation in composition; (b) by annealing at different temperatures. Two systems were shown to occur: I. austenite (mixed crystals) and cementite; II. austenite and graphite. The former is unstable, the latter stable.

WILLIAM CAMPBELL,
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DISCUSSION AND CORRESPONDENCE

THE CLOCK OF THE U. S. NAVAL OBSERVATORY

TO THE EDITOR OF SCIENCE: While not desiring to appear to enter into any controversy with the author of the article on 'The Clocks of the Greenwich and the U. S. Naval Observatories' which appeared in your issue of May 31, it would seem that certain facts should be stated to clear up the misunderstanding that has occurred.

I think no one will disagree with the statement that the value of an astronomical clock is to be measured by the degree of accuracy with which its correction can be predicted from observed corrections or interpolated between those corrections: If a series of clock rates extending over several months can be shown to follow such a simple law as that

given on page 451 of SCIENCE for March 22, 1907, for the Naval Observatory clock, viz.:

$$\text{Daily rate} = +0^{\circ}.0161 - 0^{\circ}.00103 (T - \text{Mar. 29.0}) \\ - 0^{\circ}.0456 (t - 27^{\circ}.0),$$

and when both these terms have such a probable explanation in physical phenomena, it would be folly to refrain from the use of this formula in investigating the running of the clock. It follows that the mean residual 0^s.015 is what really indicates the performance of the clock and not 0^s.035 as deduced by Mr. Lewis.

The statement by Mr. Lewis that in my article "the Greenwich clock rates are spread over a period of one year" is somewhat misleading as they were divided into twelve monthly groups and each group was considered by itself as is clearly shown on page 450 of SCIENCE for March 22, 1907. That would seem to be as fair a method of treating them as the published data would provide.

In conclusion attention may be called to the article in SCIENCE for April 12, 1907, page 570, 'A Riefler Clock and a Self-registering Right Ascension Micrometer,' in which it has seemed to the writer that the Naval Observatory clock runs even better than was indicated by the mean residual 0^s.015.

W. S. EICHELBERGER

U. S. NAVAL OBSERVATORY

VARIATION IN THE COROLLA OF LINARIA VULGARIS MILL

TO THE EDITOR OF SCIENCE: In examining the *Linaria vulgaris* Mill., with a class in botany I found the following remarkable variations in the corolla which may be of interest to some of your readers. The flowers in which the variations appeared were all on the one specimen.

In the corolla of two of the flowers in which the variations occurred the spur was absent, as was also the usual orange-colored palate. The corolla in both these flowers consisted of five petals, but in one case there were four petals in the upper lip and one in the lower, while in the other all five petals were in the position usually occupied by the upper lip.

The corolla of a third flower was tubular,

¹ Pogg. Ann., 1882, Vol. 16, p. 394.

about three fourths of an inch long, of greatest diameter at the base and tapering to the apex. At the base of this peculiarly formed corolla there were three spurs about one third of the circumference of the corolla apart. The apex of the corolla terminated in a circular crown, which was orange-colored, like the palate in the ordinary flower. At the upper end of the tubular corolla, close to the orange-colored crown, there were three petal-like tips equally distant from one another.

J. B. TURNER

THE INDIAN BEDBUG AND THE KALA AZAR DISEASE

It is not generally known by the entomologists of this country that the common bedbug of India is not *Cimex lectularius* Linnæus, but *Cimex rotundatus* Signoret (= *macrocephalus* Fieber). Captain W. S. Patton, of the Indian Medical Service, has recently published important papers on this insect, especially in regard to its pathogenic relations. In a brief note on the distribution of these two house-infesting bedbugs published in the *Indian Medical Gazette*, XLII, February, 1907, he points out the above-mentioned fact, and leads us to form the opinion that enough observations have not been made along that line. *Lectularius* is apparently distributed mainly throughout the North Temperate Zone, while *rotundatus* is tropical or subtropical; and though until very recently known from Burma only, it is now recorded by Dr. Patton as occurring throughout India, Assam, Malay, Aden, Mauritius and Réunion (Patton, *ibid.*) and still more recently (Patton, April 4, 1907, *in litt.*) it is recorded from St. Vincent, Sierra Leone and Porto Rico. I have specimens from Madras Presidency (South India), Réunion, Mauritius and St. Vincent, kindly sent by Dr. Patton.

These facts in regard to the distribution of the Indian bedbug become of economic importance in view of the now definite evidence which Patton presents that the dreaded kala azar disease of India is carried by that insect. This evidence is published as No. 27, new series, *Scientific Memoirs by Officers of the Medical and Sanitary Departments of the*

Government of India, Calcutta, 1907, and is entitled 'Preliminary Report on the Development of the Leishman-Donovan Body in the Bedbug.' By the means of extensive experiments with bedbugs, it is fully demonstrated that these bodies, the cause of the disease, are ingested from patients and go through considerable development. In a postscript to this paper, Patton states that all of the intermediate stages of development and fully developed flagellates have since been found in the insect, and he states his belief that 'it is beyond all doubt that this insect transmits the disease.' Owing to conditions, it is impossible for him to test this directly by exposing healthy persons to the attack of infected bedbugs, but as it is, the evidence is complete and all of the facts point to the conclusion reached by Dr. Patton.

The establishment of this relation of the Indian bedbug to the transmission of a much-dreaded disease naturally directs our attention again to the pathogenic relations of our own common household pest, *Cimex lectularius* Linnæus, which is now under investigation by some of the medical profession.

A. ARSÈNE GIRAULT

WASHINGTON, D. C.,
May 25, 1907

SPECIAL ARTICLES

THE SOLENODON OF SAN DOMINGO; ITS EXTERNAL CHARACTERS AND HABITS

A SPECIMEN of this rare and curious insectivorous mammal (*Solenodon paradoxus*) recently obtained by Mr. A. Hyatt Verrill in San Domingo and preserved in formol, has been submitted to me for study. Owing to the introduction of the mongoose and other causes this creature has become very rare and local. It is, without doubt, on the verge of extinction. At present, it is scarcely known in the great museums of Europe, and no specimen is known to be preserved in any American museum. A single skeleton is said to exist in the museum of Berlin. The only other *Solenodon* (*S. cubanus*), of eastern Cuba, is said to be nearly or quite extinct. It is a smaller and more hairy species, with shorter tail