



## EL MENSAJERO

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### Information on Vinchucas and Chagas Disease

*Ils ne mouraient pas tous, mais tous étaient frappés.*

Les animaux malades de la peste.  
La Fontaine.

*Following a significant increase in the number of vinchucas observed at La Silla during the last summer, the Director-General of ESO asked Prof. Hugo Schenone, Director of the Department of Microbiology and Parasitology of the University of Chile to pay a visit to La Silla to investigate the situation. The following gives a summary of the resulting report.*

**What are vinchucas?** They are insects which belong to the "tratominos" group. Both the adult and the young of this species feed exclusively from the blood that they get by biting diverse animals such as mammals, birds and reptiles, including human beings.

**How do vinchucas reproduce and develop?** The pregnant females place their eggs, which are approximately 1.5 mm in length, in protected places. The young that come from the eggs are called nymphs. During the growth period, they change their skin until they reach the size of adults. The adults, which in general are winged, are egg-shaped, measure approximately 2 cm in length and are of black or dark brown colour. Their abdomens have yellowish or reddish spots in an alternation. The young or nymphs are either greyish or brown, the colour of earth.

**In which countries do vinchucas exist?** They exist in practically all countries of the American continent, except Canada.

**Are they the same kind in all these countries?** No. Numerous species exist, although some are common to several countries of the same region. In Chile only two types exist: a domestic

one called *Triatoma infestans* (lives in homes) and one living in the wild, called *Triatoma spinolai*. They have been found in rural regions between the latitudes 18° and 34° South.

**Do vinchucas carry any disease?** Yes, the so-called Chagas disease or American trypanosomosis.

**What is Chagas disease?** It is a parasitic infection produced by a protozoan called *Trypanosoma cruzi* which can be transmitted by infected vinchucas. The vinchuca does not inject the parasite when it bites, but on some occasions when the vinchuca has sucked much blood it may defecate and eliminate *T. cruzi* together with the defecation. This defecation, which appears like a dark coffee coloured liquid drop, may be clearly visible, and can contaminate either the wound made by the bite or small erosions of the skin caused by scratching, or it can fall directly into the ocular mucous membrane, thus starting the infection.

In the majority of cases, the vinchuca bite does not produce any infection, because not all vinchucas are infected, and it is necessary that they defecate at the moment of biting.

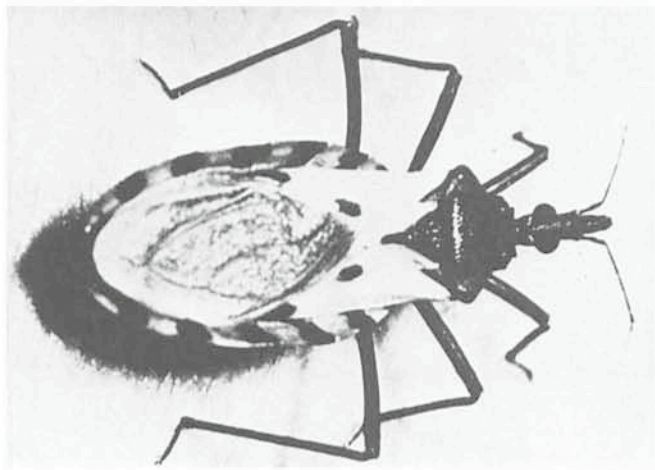
When infection occurs, after an incubation period without symptoms which lasts approximately ten days, symptoms may become evident that correspond to the acute phase of the illness which is characterized by swelling at the place of the bite where the parasite penetrated the skin, by fever, and by general malaise; very exceptionally one may suffer myocarditis and/or meningitis. After some weeks these symptoms diminish and may disappear, giving the impression of an apparent sudden cure of the infection.

Starting in the sixth month after the initial infection the illness enters its chronic phase which lasts during the whole life of the person and during which symptoms of myocardial effects, of the esophagus or the colon may appear.

In the majority of cases the infection shows no symptoms from the beginning.

**Can other animals be infected by the "Trypanosoma cruzi"?** Yes, specially the terrestrial mammals, wild and do-





One of the vinchucas that were sent to Europe for a test some years ago. Photographed by Dr. G. Schaub of the Zoological Institute of the Freiburg University (FRG).

mestic, which can be the source of infection of the domestic or wild vinchucas.

*Does any medical treatment exist for the Chagas disease?* Yes. At present two types of drugs exist, Nifurtimox and Benznidazol, both of proven efficiency.

*What is the situation at La Silla?* In this area the wild species *Triatoma spinolai* exists which, being attracted by the odor of humans, may bite them, especially during sleep.

The risk of infection for people is low, because only a very small percentage of infected vinchucas (6.5%) have been found, and moreover it is necessary that they defecate at the moment of biting.

*What precautions can be taken?* Use of protective screens against insects in the windows of the dormitories.

The ESO Administration is putting into practice a series of technical measures to control the vinchuca problem. In case a person is bitten, the appropriate blood test will be arranged. So far these tests have always had a negative result.

## Star Formation in Bok Globules

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### Introduction

Among the many dark clouds seen projected against the luminous band of the Milky Way are a number of small, isolated compact clouds, which often exhibit a large degree of regularity. These objects are today known as Bok globules, after the Dutch-American astronomer Bart Bok, who more than 30 years ago singled out the globules as a group of special interest among the dark clouds.

Bok globules usually have angular sizes of from a few arcminutes to about 20 arcminutes, with real sizes of typically 0.15 to 0.8 parsecs. It is generally not so easy to estimate the distance, and thus the dimensions, of a given globule. Most known globules are closer than 500 pc, since they normally are found by their obscuring effects, and more distant globules become less conspicuous because of foreground stars. A nearby, compact Bok globule is indeed a spectacular sight; when William Herschel for the first time saw a globule in his telescope, he exclaimed: "Mein Gott, da ist ein Loch im Himmel."

For many years the main tool to study globules were counts of background stars seen through the outer parts of the globules. When carefully and correctly executed, star counts can provide much valuable information; but with the advent of molecular radio astronomy it has now become possible to obtain precise data on masses, temperatures and composition of the globules. Typical globule masses are between  $15 M_{\odot}$  and  $60 M_{\odot}$ , and temperatures are around 10 K to 20 K. The interior of such a small, cold cloud is well protected against the more energetic radiation from stars, and so various atoms can combine to molecules, mainly of hydrogen, with important additions of carbon oxide, formaldehyde and many more exotic molecules.

Bok's conjecture in singling out the globules as a group was that, if stars (radius  $\sim 10^{11}$  cm, density  $\sim 1$  g/cm<sup>3</sup>) form out of denser regions in the interstellar medium (radius  $\sim 10^{19}$  cm, density  $\sim 10^{-22}$  g/cm<sup>3</sup>), then intermediate stages might be seen, representing proto-proto stars.

Subsequent observations have clearly shown that the main regions of star formation are not globules, but giant molecular

clouds, in which thousands of stars can form. Although globules thus are no longer necessary to understand the bulk of star formation in our galaxy, it is no less likely that a globule can form one or a few stars. The problem with this idea is just that no newborn stars had been found in association with a *bona fide* Bok globule.

### The Globules in the Gum Nebula

This situation has changed with the recent discovery of a large complex of globules in the Gum Nebula. The Gum Nebula is a huge, faintly luminous H II region spread over more than 30 degrees of the southern sky. At a distance of roughly 450 pc this corresponds to a radius of about 125 pc, making the Gum Nebula one of the largest structures known in our galaxy. Near its center are several objects which together produce the ultraviolet radiation that ionizes the gas in the nebula. Among these are Zeta Puppis, an extremely luminous O star with a mass of about  $100 M_{\odot}$ , Gamma Velorum, which is a massive binary system consisting of a Wolf-Rayet and an O component, as well as the Vela pulsar, a neutron star left over from a supernova explosion 10,000–20,000 years ago.

Pointing towards these objects are about 40 "windswept" or "cometary" globules, with sharp edges towards the center of the Gum Nebula, and several parsecs long, faintly luminous tails stretching in the opposite direction. This appearance can be understood as the eroding effect of the ultraviolet radiation from the luminous central stars, causing the globules to slowly evaporate and carrying material away from the dense globule heads. In this hostile environment most globules will be destroyed in a few million years. But this is long enough that stars can form in the denser globules.

### Barnes 135

Associated with one spectacular globule, CG 1, is a star, numbered 135 in a catalogue of nebulous stars by Barnes (Fig. 1). The diameter of CG 1 is 0.3 pc and its total length is 3.2 pc, and the mass of its dense head is probably of the order