# Comments and Communications

## Astronomy in the Manner of *1984*

War is Peace
Freedom is Slavery
Ignorance is Strength
—George Orwell, *1984*.

"In the bourgeois countries we often observe [scientists] helplessly marking time. Let the reader judge for himself how completely benighted are the ideas of many foreign astronomers: [they believe that] all stars are constituted according to a single model, all stars obey a single mass-luminosity relation, all stars originated at the same time, all galaxies were born at the same time—simultaneously with the stars and hence simultaneously with [what they believe to be] the only solar system in existence, and of course also simultaneously with the earth." These "absurd theories" are represented as an attempt of the Western astronomers "to ascribe the origin of the solar system to an excessively rare, unique, occurrence in the universe. This immediately leads them to propound the uniqueness of mankind and, in effect, represents a return to the old geocentric system, to anthropocentrism, and to popery."[1]

Such "reactionary theories" are attributed to Jeans, Jeffreys, Eddington, Milne, Lyttleton, Hoyle, de Sitter, and a host of other Western scientists "among whose ranks there are, however, a few progressive workers who have tried to comprehend the structure of the universe from the position of materialistic science."

Among the "formalistically thinking capitalistic astronomers" mentioned as "not having succeeded in lifting themselves to the level of a comprehensive theoretical understanding of the entire problem" is the theoretical astrophysicist Chandrasekhar "to whom the final goal is the theoretical analysis of some kind of simplified scheme of galactic structure," whereas in reality "the galaxy is complex and in its evolution becomes ever more complex."

The author of these comments is P. P. Parenago, professor of astronomy at Moscow University, and one of the best-known and universally recognized Soviet scientists. It is remarkable that only a few years ago the same Russian author, in a textbook on stellar astronomy, extensively used Chandrasekhar's work—so extensively, in fact, that his introductory acknowledgment in the second edition to the effect that an entire chapter of more than 100 pages "was completely rewritten, principally under the influence of the publications by Chandrasekhar" reads like an understatement.

But, of course, that was in 1944, and the adverse quotations are from a recent book *The World of the Stars* (1951). In the intervening years A. A. Zhdanov had laid down the official line of the Soviet Communist Party, which attacked the "idealistic" approach to science of those who "do not understand the dialectic road to knowledge . . . and convert their impotent scientific efforts into a slander of nature." Hence, it becomes now a duty to show that "on the ideological front Soviet astronomy has launched a decisive attack," and that victory "is assured by the paternal interest of the greatest genius of humanity, Comrade Stalin." It seems that the formalistic and capitalistically poisoned results of Chandrasekhar were ideologically purified when clothed in the binding of the *Gostekhizdat*.

Propaganda of this kind has been in progress for so long a time that it may actually be believed by those who repeat it over and over. It may be appropriate to record here a few pertinent observations in the hope that they may come to the attention of our colleagues in the Soviet Union.

The allegations of a medieval mysticism in Western science are, of course, false, as are the specific accusations from Parenago's book. Most Western astronomers are at least as "materialistic" in their scientific reasoning as are their Russian colleagues. Most of them genuinely admire the astronomical work that is done in Russia and are not aware of any basic difference in scientific method between astronomers of Communist and non-Communist countries. The Russian scientific literature abounds in appeals to the scientists of all nations for a peaceful solution of the world's difficulties. Will the Russian astronomers not give thought to the question whether these appeals are consistent with the flow of invective from the Soviet Union?

There was a time—not many years ago—when modesty was a virtue on both sides of the curtain that now divides the East from the West. Has the proverbial kindness and generosity of the average Russian been lost in exaggerated self-praise of the kind illustrated by the following quotations?

"In opposition to the naïve, religious concepts regarding the origin of the world and the idealistic pronouncements of capitalistic science, [our] materialistic science maintains that the universe is infinite in time and in space. . . . It is thus that the minds of the people are being poisoned in the capitalistic countries! Our readers will have a good laugh at these strainings of the foreign devil-worshippers." But "against the background of this impoverishment of science in the capitalistic countries, we in our country create remarkable theories and carry out important observations." A long list of claims follows, some of which are historically incorrect. For example, Ambarzumian did not "discover" the existence of "stellar associations," although he deserves great credit for his remarkably stimulating ideas regarding their na-

[1] The Russian word *popovshchina* cannot be exactly translated; the word "clericalism" does not give the correct meaning.

ture and origin. Has the memory of Kapteyn been "vaporized" in the Soviet Union and the great Dutch astronomer become an "unperson"? (See Orwell's *1984*.)

OTTO STRUVE

*Leuschner Observatory*
*University of California, Berkeley*

## Mercury as a Casting and a Contrast Medium

THE study of the ear is essentially the study of the interior of the temporal bone, since the labyrinth is completely enclosed by the petrous capsule. A technique for preparing metal casts of the petrous bone was described in a previous issue of this journal (*1*), and this process was later expanded to include the entire temporal bone (*2, 3*). The need for extending this casting method to embrace the limiting membranes became obvious, and a search was made for lower-fusing metals that would not cook or distort the delicate tissue-membranes of the intact temporal bones of human autopsy specimens or the living ears of experimental animals. The search led to the selection of a metal that needs no heating, but is already molten at normal body temperatures. Thus, mercury was instilled through the round or oval windows, and x-ray studies were made with serial stereoscopic views.[1] This not only reveals the contours and outline of the labyrinth itself, but such associate channels as the endolymphatic and perilymphatic ducts. As a result of these studies it was found that, contrary to the generally accepted opinion, the perilymphatic duct does not communicate with the subarachnoid space of the hindbrain but is limited by a terminal sac, similar to the endolymphatic duct and sac (*4*).

The channels by which the perilymphatic fluid normally escapes from the confines of the bony labyrinth have long been debated. Prolonged serial x-ray studies of mercury-filled labyrinths in experimental animals show the escape of this fluid through channels that course in the tegmen tympani and traverse the petrotympanic fissure and continue along the Eustachian tube to the lymph nodes of the nasopharynx. The presence of these channels has been confirmed (*5*) by hard metal casts of the temporal bone and by chemical dye studies (Prussian blue).

When mercury in 2- or 3-ml amounts is injected into the carotid artery of *Macacus rhesus,* the entire carotid system is rendered radiopaque even to the terminal papillary arterioles, but none of the mercury traverses the capillary bed to the venous side, thus giving a true arteriogram. The animals showed no deleterious effects from the mercury instillation during the 3 or 4 hr ensuing before the experiment was finally terminated.

[1] A watertight union may be made with the labyrinth through either of its windows by first inserting a piece of tightly fitting "radio spaghetti" through the window and then forcing the blunted end of the hypodermic needle through the constricted lumen of the spaghetti tube. This may be re-enforced with bone wax, liquid cement, or plaster of Paris, to insure against leakage.

It appears that this cheap and readily available metal offers a superior medium for forming metal casts of various body cavities, as well as a contrast medium for studying fine arterial and lymphatic channels with the aid of x-rays.

M. WHARTON YOUNG

*Department of Anatomy, College of Medicine*
*Howard University*

**References**

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4. *Ibid.,* **112**, (2), Suppl., 102 (1952).
5. *Ibid.,* **103**, (3), Suppl., 108 (1949).

## Soxhlet Extraction at Reduced Temperature

IN THE course of a study of alkaloids from Tasmanian plants, it was necessary to extract about 1½ kg of material with chloroform, and since the alkaloids extracted were likely to be heat-sensitive, the extraction had to be carried out at as low a temperature as possible. The simple apparatus illustrated in Fig. 1,

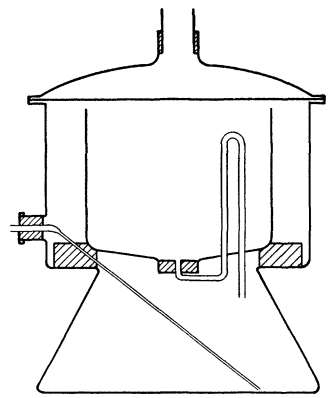

FIG. 1.

which was found to be quite satisfactory for the purpose, consists essentially of three parts. The outer vessel, which contains the boiling chloroform, consists of a large vacuum desiccator, with an opening for evacuation at the side, through which an air or nitrogen leak reaching to the bottom of the vessel can be inserted. The lid of the desiccator is replaced by one from another vacuum desiccator with an opening at the top, on which is mounted an efficient condenser. The two rubber stoppers are protected from the solvent by coating them with a thick paste made from dextrin, mannitol, and glycerol.

The vessel that contains the material to be extracted consists of the upper half of a large bottle with a syphon tube mounted in a cork in the neck. The material is placed in a circular filter paper folded so as to form a large pleated cup fitting inside the extraction vessel.

The apparatus, heated in a water bath, is used under reduced pressure in conjunction with a modified form