

there is a decrease of almost \$1,500,000 in appropriations, compared to 1931-32. For some years the Geological Survey has been engaged in making a topographic map of the United States. It is expected that the Congress will follow recommendations of the committee in cutting this work down by at least \$100,000 more than suggested by the budget, which was a \$164,000 decrease. Geologic surveys, for which \$400,000 was asked (the same as the amount appropriated for 1931 and 1932) will probably be cut \$50,000; likewise fundamental research in geologic science, for which \$100,000 was asked. Volcanologic surveys will probably be cut down from \$35,000 in 1931-32 to \$21,000. The main volcanologic observatory of the United States is in the Hawaiian Islands on the great volcano of Kilauea. Investigation of the mineral resources of Alaska, an item for which it was hoped there might be \$84,500, the same as in 1932, was reduced by \$17,000. Gaging streams and determining water supply of the United States has been cut \$119,500. It had been estimated that \$719,500 would be required. Other items suffering cuts are the classification of lands, the printing of geologic maps, and investigations of minerals on public lands and naval petroleum reserves.

IN order to achieve a broader representation of sportsmen and conservationists upon the Advisory

Board, Migratory Bird Treaty Act, and to obtain a large measure of local cooperation in the problems of conservation and enforcement, a reorganization of the board is being planned by Secretary of Agriculture Hyde. As a means of securing more direct regional representation on this board, the states have been tentatively divided into ten groups. These groups are so arranged as to give consideration to such matters as relative density of population and dissimilarity of conditions affecting migratory birds, as well as the various interests of those who are concerned in their welfare. A majority of the members of the board will be selected from these groups in cooperation with and upon the recommendation of the state conservation officials. The advisory board is organized for the purpose of assisting the federal authorities in a solution of regulatory problems in connection with the federal administration of the migratory bird resource. When constituted, it will be requested to study and recommend definite policies upon all questions affecting the interest of the sportsmen and conservationists of the United States and falling under the jurisdiction of the Biological Survey, U. S. Department of Agriculture. Such subjects as length of seasons, bag limits, shooting restrictions, zoning, measures for increasing the supply of both upland game birds and water fowl and measures for conserving the existing supply will be submitted to it.

DISCUSSION

THE PROCESS OF GIORDANO BRUNO

IN his presidential address to the Astronomical Section of the American Association for the Advancement of Science published in *SCIENCE* of January 8, 1932, President D. W. Morehouse says: "Suggestions were heard on every side that such views should be forcibly repressed, and some of its advocates, for example, Bruno, were condemned to death and burned at the stake in 1600. As history records, the second martyr of the Jesuits was harassed and persecuted solely for his adherence to the Copernican system." This statement is erroneous.¹ The external data of Bruno's life are the following:

Bruno was born in 1548 in Nola, a small town near Naples, entered the Dominican order at the age of 14 or 15 years, and left the order in 1576, travelled then extensively in Italy, France, Switzerland, England and Germany. He returned to Italy, was accused in Venice, arrested and tried there in 1592 before the Inquisition. In 1593 he was extradited to Rome,

where his process lasted until 1600, in which year he was condemned and burned at the stake. The question now arises as to what the reasons for this condemnation were.

The documents of the Venetian process were first published by Berti. A more recent book is by Father Luigi Previti, S.J., "Giordano Bruno," Prato, 1887.² The documents of the Venetian process contain first the denunciation by Giovanni Mocenigo on the grounds of heresies concerning the Trinity, the sacraments, the transmigration of souls, the existence of an infinite number of worlds and the eternity of the world, besides teaching conjuration (I am not giving the complete list). After a number of purely formal documents we find then a complete record of the interrogation of Bruno. This record gives the impression of stenographic accuracy; the questions of the court apparently being written down beforehand in grammatically correct style, while the answers of the accused show all the characteristics and repetitions of extemporaneous speech. One can judge the points

¹ Sir James Jeans says also in his book, "The Universe Around Us," that Bruno was condemned because of his advocacy of the Copernican theory.

² I am indebted to Father Gerald Walsh, professor of history at Woodstock College, for drawing my attention to this book, and putting it at my disposal.

which were used in the indictment from the questions which were asked. They concern points in the dogma of the Trinity, incarnation and the sacraments. He was questioned whether he had said that Christ and the Apostles were magicians (or sorcerers?), whether he believed in the migration of souls. He was asked, and confessed, that he had taught that fornication was a small sin and had condemned the church in forbidding it. He ("the martyr of science") was accused of defending conjuration. Furthermore, he was questioned about his associations in Geneva and England (where he had written a book "Spaccio della Bestia trionfante"—"Expulsion of the Triumphant Beast"—interpreted as aimed at the Church). In the whole interrogation there are only three places which are even slightly bearing on the question of natural science. At the beginning of the interrogation, upon being asked whether he confesses errors, he himself said that he had taught the existence of an infinite number of worlds and that the earth was one of the stars. But this point was not taken up in the questioning, and is not contained in the summing-up of his errors which is given by the court (Previti, p. 351).

The second point was on determinism and was contained in the question whether he had denied Providence (p. 357). Finally, he had at the beginning handed over a list of all his published books. He was asked why this did not contain the book "cena delle ceneri." He answered that this book, published in England, treated of the motion of the earth. No further mention is made of its contents—they had not been questioned (p. 358). Nowhere is there any mention of the Copernican theory in the whole process. In the request for extradition which the Papal Nuncio addressed to Venice, Bruno is accused of his associations in Geneva, France and England, and of heresies concerning the dogma of the incarnation and of the Trinity. No mention whatsoever is made of any physical theory.³

The acts of the Roman process are not published, except a few purely formal ones, but as the punishment is one reserved for relapsed heretics one must assume that it went over the same ground as the process of Venice. There do exist documents to show that here too there was no mention of Copernicus' theory. There exists a letter of Gaspare Scioppio (Kaspar Schopp) to Conrad Rittershaus. Schopp⁴ was an eye witness of the execution and says that he had heard the sentence proclaimed. According to him, Bruno was condemned because of heresies against the

³ It will be found that this presentation agrees with the one in T. L. MacIntyre, *Giordano Bruno*, London, 1903, although this author is very favorable to Bruno.

⁴ This letter can be found in Previti's book on page 440.

sacraments, the incarnation, because of teaching the transmigration of souls, the innumerability and eternity of the worlds, because of his denial of the divinity of Christ and the statement that Christ and the Apostles were magicians. It is true that the authenticity of this letter is denied by some; however, in a book published eleven years later, he says that Bruno was executed because he did not want to abjure his pagan acceptance of "portenta et monstra" (apparitions), and his statements against Christ and the Apostles (Previti, p. 211).

However, there is another argument which seems to me quite independent of the documents and quite convincing that the condemnation of Bruno had nothing to do with Copernicus' theory, and that is a simple comparison of the dates. Bruno was tried in 1592 and executed in 1600. In 1611 Galileo came triumphantly to Rome, and it was not until 1615 that proceedings against him were begun. It is quite clear that if there had already been proceedings on account of this theory, and if Bruno had been condemned to the stake in 1600 for it, the adversaries which Galileo had before 1615 would have behaved quite differently and would not have failed to point out that he was defending the theory on which the Inquisition had already acted. Galileo himself, of course, would also have behaved quite differently in this case.

As to President Morehouse's remark, "the second martyr of the Jesuits," it might be said that on the Roman tribunal of sixteen judges there were 12 seculars, 3 Dominicans (Bruno's own order) 1 other monk and 1 (!) Jesuit.

Bruno might perhaps be called a martyr to Pantheism, to Buddhism, to Unitarianism, but surely not to science.

K. F. HERZFELD

THE JOHNS HOPKINS UNIVERSITY

A SMALL INSECT WHICH STINGS SEVERELY

IN November, 1925, a minute black hymenopterous insect, scientifically known as *Epyris californicus* (Ashmead), was first sent to the University of California by a farmer at Clarksburg, Yolo County, California, with the statement that it had severely stung a child several times and was the cause of severe pain and considerable inflammation. Due to the fact that the insect in question is barely over 5 mm in length, the idea of its being so formidable was doubted. Specimens forwarded to the Bureau of Entomology were determined as the above by S. A. Rohwer, who stated that they were the only other ones seen up to that time which agreed with the original types.¹ Although informed that probably

¹ W. H. Ashmead described the species as *Mesitius californicus* from several specimens taken in California