Caenorhabditis Genetics Center

A *Caenorhabditis* Genetics Center (CGC), sponsored by the National Institute on Aging, is being established at the University of Missouri. The CGC will be responsible for acquisition, banking, and distribution of *C. elegans* strains and reference strains of other *Caenorhabditis* species. Related services will include maintenance and annual distribution of the genetic map of *C. elegans,* coordination of genetic nomenclature, and maintenance and distribution of a bibliography of research publications.

The centre is the only one planned for *Caenorhabditis elegans,* an organism that has attracted attention in recent years as a research model for genetics, neurobiology, and developmental biology as well as aging.

The establishment of a *Caenorhabditis* Genetics Center (CGC) will promote the rapid and orderly accumulation and documentation of the genetic wealth of *C. elegans* for the benefit of all types of biomedical research on this organism. The genetics of *C. elegans* already enjoys important advantages over more traditional genetic systems. The ability to freeze stocks permits the reliable preservation of all known mutant types. The ancestry of virtually all strains is known so most stocks can be accurately described. A uniform system of genetic nomenclature has been instituted. Since most genetic data have been accumulated in only a few laboratories, the centralization of these data is feasible.

The specific goals of the CGS are (1) to establish a reliable and accessible genetic stock repository, including representative mutant alleles of all characterized genes as well as chromosome rearrangements, (2) to coordinate and publicize a uniform genetic nomenclature, (3) to coordinate and publicize the delineation of the genetic map, and (4) to develop a computer-based data storage and retrieval system which will handle bibliographic information and data used to generate the genetic map, as well as descriptive data on mutant strains.

The CGC strain collection will include at least one allele of each identified gene, all available chromosomal rearrangements, and available closely linked double mutants, as well as other strains useful for genetic mapping. Laboratories providing mutants of *C. elegans* will be requested to include such information as name of strain; names of contained mutation(s); mutagen used; whether the strain was backcrossed and, if so, how many times; genes affected by the mutation(s), map location(s) of mutation(s); and data used to determine map locations.

C. elegans strains will be available without cost to all qualified investigators pursuing genetic and/or related studies with *C. elegans.* The Center will not be fully operational until the Fall of 1980, but some services are available now. Inquiries should be addressed to: Dr. Margaret M. Swanson, Curator, or Dr. Donald L. Riddle, Director, Caenorhabditis Genetics Center, Division of Biological Sciences, Tucker Hall, University of Missouri, Columbia, Missouri 65211.

The early development of iron-working

from T.C. Champion

TRADITIONAL explanations for the adoption of technological innovations in archaeology are being called into question by recent research. Much attention has been paid to the origins of metallurgy, and to the possibility of multiple independent inventions of copper working, but until recently the development of iron working had been relatively ignored. Recent work now suggests that the discovery of iron did not occur in one unique area from which its knowledge was diffused, that early iron was not superior to bronze, and that bronze-using communities did not adopt it immediately. Instead, what has usually been regarded as an obvious technological advance appears, when seen against the background of current economic and social conditions, to be due to much more complex reasons.

The traditional view held that the technology of iron was developed only in the Near East and was guarded as a royal monopoly by the Hittite empire during the second millennium. The collapse of the empire about 1200 BC allowed the knowledge of iron-working to spread to other areas where the new material was progressively adopted as its potential for making superior weapons and tools was appreciated. This view was based as much on the interpretation of Hittite historical documents as on archaeological finds but recent work by Waldbaum (*Stud. Mediterr. Archaeol.* **54,** 1; 1978) now shows it to be untenable. Iron was known and used regularly throughout the area of the eastern Mediterranean from the early bronze age onwards and though some finds are known from as early as the beginning of the third millennium they become much more common in the mid-second millennium. Tools, weapons and jewelry are all made in iron. As the forms are in most cases specifically local ones which copy pre-existing bronze examples it would seem that iron was worked locally rather than imported from a single centre. Though the types vary considerably, many of the contexts from which they come are of high status, being predominantly rich burials. In addition a number of objects combine iron with a precious metal, such as iron rings with a covering of sheet gold or an iron pin with a gold head. It is clear that iron was being increasingly used in societies with a highly developed competence in metallurgy, frequently but not exclusively in association with objects of high status. Analyses have so far been few, but many of these early iron objects have been considered meteoric on the grounds of their high nickel content. There has been some controversy over objects with a rather lower percentage of nickel, but there can be no doubt that throughout the period, and increasingly towards the later phases, terrestrial ores were also being exploited.

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Similar evidence of an early origin for iron-working has also come from other areas. Some of the most exciting archaeological discoveries of recent years have been made at Ban Chang in north-east Thailand. In addition to surprisingly early occurrences of agriculture, irrigation and copper metallurgy, iron was in use by at least 1600 BC. As Gorman and Charoenwongsa (*Expedition* **18,** 14; 1976) show, iron was used especially for the blades of bronze-handled weapons found in rich graves. In China, iron was similarly used in a composite bimetallic weapon in a rich grave of the Shang period at K'ao-Cheng, perhaps around 1200 BC. As Chang (*Archaeology of China,* 351; 1977) points out, there too the iron may be of meteoric origin since other comparable weapons, now in western museums, have been proved to be so.

In Europe too, reports of early iron have increased considerably in recent years. Brongers and Woltering (*Prehistorie van Nederland,* 97; 1978) describe finds of iron and slag with radiocarbon dates as early as the 12th century BC, while an iron fragment from a knife found in Slovakia is dated to 1465±35 BC (Butler in *IX Congress UISPP, Résumés,* 431; 1976). Another line of evidence has been followed by Bouzek, who has studied the technology of the decoration of bronzes in the late bronze age (*Zeitschr. f. Archäol.* **12,** 9; 1978). He found that iron tools were increasingly used from 1100 BC, a conclusion now supported by the discovery of the appropriate iron tools in contemporary graves. The only detailed regional study is by Laszlo (*Acta Archaeol. Hung.* **29,** 53; 1977), who documents recent discoveries in Romania, where iron became progressively more common through the later bronze age from 1200 BC onwards, copying the local bronze forms and even being manufactured in the same workshops as bronze.

All these regions share a number of common features such as the pre-existence of a developed metallurgical technology, the copying of bronze forms in iron, the large proportion of iron objects which are

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