

# Perspectives of research on fossil corals and sponges

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**Abstract:** The present level of fossil corals and sponges research, as defined by number of specialists and volume of publications, seems to be endangered. Negative trends presented in the literature (e.g. Sando, 1997) seem to develop as predicted. Many of us indicate that there are no successors to continue our investigations.

The best hope of reversal of these tendencies I see in founding digital databases both of fossils and of papers. This action will upgrade the basis of our research, it will add value to our collections of fossils, attract new students, broaden and enliven interest in fossils in our societies, and facilitate future increase of funding. Moreover, the databases will benefit our own research, by providing improved versions of paleontological treatises, with as much data and as high accuracy as we will be willing to collect and share with each other. This aim might be impossible or hard to accomplish by single workers.

Not only paleontology of corals and sponges, but any branch of science, based on classification of numerous and diversified objects, may and should proceed along these lines.

**Key words:** taxonomic research, digital databases, data upgrading, data collecting, data sharing

## Contents

1. Introduction . . . . .	518
2. Where we are? . . . . .	518
3. Which way should we go? . . . . .	519
3.1. Improved standards of research . . . . .	519
3.2. Protection and accessibility of fossil collections. . . . .	519
3.3. Data bases and data sharing. . . . .	520
3.3.1. Standards of digitalisation. . . . .	520
3.3.2. Archives of fossil corals and sponges . . . . .	520
4. Conclusions . . . . .	520
References. . . . .	521

## 1. INTRODUCTION

To indicate and discuss the perspectives, the first step is diagnosing the current state of research of fossil corals and sponges. Such a diagnosis, albeit highly incomplete, will be presented, based on the literature data and on the "where we are?" enquiry (WRZOŁEK, 2002b). The latter yielded predominantly pessimistic opinions on current state of our affairs. Be it this way (I am afraid it is really bad!) or the other, we can and should discuss what can and should be improved in our future scientific activities. These matters will be discussed in the second part of this paper, and the conclusions are intended as a sort of guidelines of activity of the International Association for the study of Fossil Cnidaria and Porifera (IAFCP). I hope that even partial implementing of the recommendations presented in this paper, besides direct profits to our community, may change the unfavorable aura surrounding paleontology in general and study of fossil corals and sponges in particular.

In a way not much has changed for over 30 years of activity of our Association. The remarks of SOKOLOV (1979) on future activities of IAFCP, with small, mostly technical changes, still remain valid, and in essence, form the core of conclusions of the present paper. New is the technical ability to cope with more and more data, to have it arranged and rearranged with a single "click" of our computers keyboards and distribution of the results as quick as the speed of light permits.

## 2. WHERE WE ARE?

Many aspects of this diagnosis can be extracted from the literature, with numerous papers published in the Münster Symposium materials (IWANOWSKI, 1993; SANDO, 1993; TURNSEK & LÖSER, 1993). Important contributions were given in Madrid by SANDO (1997) and in Sendai by FEDOROWSKI (2001). Also the IAFCP Newsletter discussed some of these matters (WRZOŁEK, 2002b). To summarize: the last decade saw growing consciousness of decreasing manpower, funding and scientific outcome of studies of fossil corals and sponges. The plain numbers do not seem to be alarming. OEKENTORP (2003) counts 340 students of fossil cnidarians and sponges, whereas in 1993 IAFCP Members Directory listed were 328 members / 378 specialists (SANDO, 1997: table 4). On the other hand there are numerous voices of warning. Both papers cited above and responses to the "where we are?" enquiry speak about decline in funding, lack of public understanding of the role of sciences, paleontology including. Some respondents say that dinosaurs and fossil hominids stole attention of the public and the public funding. Although the responses were obtained from only 50 out of 340 corals and sponges workers, the unanimity of voices leaves little room for optimism.

Limited funding is not the only trouble. To make the matters worse, the respondents confirm low or null number of their scientific successors. This is sad: we are a very small community, and as paleontologists we know that small populations are prone for extinctions. Are there any chances of recovery? I am afraid we may face the generation gap.

### 3. WHICH WAY SHOULD WE GO?

First of all I hope everybody will agree that we should try to save our ship and that it is worth saving. In my opinion our best hope is not so much in what we can get from the society and from the politicians – this help may be far off – but in improved organization and standards of our scientific activity and in upgrading results of our former research.

#### 3.1. Improved standards of research

This point has been discussed many times, and as it seems much remains to be done. An example can be taken from my current research. In my study of stratigraphic distribution of the *Cyathaxonia* fauna (WRZOŁEK, 2002c) low stratigraphic resolution and imprecise taxonomical concepts are indicated as main source of errors. In turn in my research on Devonian massive Phillipsastreidae (in preparation), review of literature indicates that the majority of species are illustrated by holotypes alone and nothing more. There are only few bright exceptions to this rule. In many cases not even repositories are given by the authors. Moreover, there seems to be little chance of finding support in getting access to collections of Phillipsastreidae not only in China and former USSR, but also in Australia: it seems as if half of the Devonian corals existed only in form of poor photographs, dispersed in dusted papers. Due to these circumstances my study, initially aimed at global revision, must be limited to the Holy Cross Mountains, with well founded comparisons limited to Devonian Europe, North Africa and North America – the other records are almost non-existing. So is the understanding of variability and space and time distribution of phillipsastreids. This will hold true, I am afraid, for many other fossil taxa of corals and sponges.

In a way it speaks about deficiencies of literature basis of our research. Thus care should be taken not only to improve the future research, but also to have the older data revised and upgraded, especially by digitalizing unillustrated material, which formed basis for our taxonomic decisions.

#### 3.2. Protection and accessibility of fossil collections

So many times in the past we witnessed destruction, either malicious or accidental, of valuable collections, so many times the material we are looking for happens to be “misplaced or lost”, so many times there is nobody, who can guide us through collections in far or close parts of the World. These bad circumstances occurred in the past, this is what is going on today, this will certainly happen in the future. But now some optimism: we have a powerful tool to fight these sad circumstances, in form of not-so-sophisticated hardware and software, enabling us to digitalize our graphic and text data, to multiply it and distribute as broadly, as we can only wish. Paradoxically, the best protection of our collections can be obtained by enabling everybody to share our resources.

### 3.3. Data bases and data sharing

We may easily immortalize our fragile thin sections by using a scanner of high resolution, with device for transmitted light (nota bene scanners can also be used for obtaining fairly good photographs of fossils exteriors). Archivisation and sharing of data thus obtained may be the main factor of survival (or future revival) of paleontology. Therefore let us accept the idea: no new papers without attached library of good illustrations!

#### 3.3.1. Standards of digitalization

I think they can be easily agreed upon. As for the graphical data I would recommend strict usage of acronymed symbols of specimens, symbols of type of digitalized material (exterior, transverse or longitudinal section, ontogenetic series, etc.), then original resolution of scanned material, to avoid doubts as for magnification. Lists of scanned material should be presented at IAFCP web pages, preferably in form of a single data-base, to facilitate looking for particular entries, with names and addresses of people responsible for curation of the material. Then anybody will know whom to ask and for what – costly, lengthy and in many instances unsafe journeys will be limited to absolute necessity.

#### 3.3.2. Archives of fossil corals and sponges

Here we are at the output end of all these efforts at digitalization of our data. We can collectively create the new "supertreatise" with as much data and as high resolution – in any aspect: taxonomy, geography, stratigraphy, ecology – as we only want to have (WRZOŁEK, 2002a). This task will be almost achieved if we will be able to upgrade our past papers to the new standards suggested above.

The same procedures of data digitalization should be employed for the paleontological literature, recent and older, so important in any taxonomic studies. As efforts are undertaken to digitalize vast general libraries, I can see no reason not to do the same with the paleontological literature. This will facilitate access of the newcomers, this will stimulate efforts at taxonomic revisions and search for material lost or misplaced in our museums.

## 4. CONCLUSIONS

Improvement of scientific activity of IAFCP Members (if paleontological research of Cnidaria and Porifera does not survive) demands digitalization of published data: papers and collections; also unillustrated material form the basis of taxonomic conclusions and should be digitalized and distributed, thus offering broad access to fossils and paleontological literature via internet.

IAFCP should recommend these steps to all individuals interested in fossil corals and sponges and help organize a forum of data acquisition and storage, with supervision of quality of data collected.

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### Note added in proof:

To implement the ideas presented in the current paper (databases, data sharing, upgrading of older papers), in January 2005 the present author initiated the Virtual Paleontological Museum at the pages of the University of Silesia (<http://www.rugosa.wnoz.us.edu.pl>), with access to illustrations and measurements of numerous rugose corals, as listed in five papers of WRZOŁEK from the years 1982–2005.