

Correspondence

Medice, Cura Te Ipsum!

Dear Sir,

I would like to refer to the recent article analyzing foreign postdoctoral training of 70 Croatian fellows (1). I applaud the author's willingness to tackle this extremely complex and sensitive issue from different aspects, as well as his effort to maintain objectiveness. However, his presentation has two apparent shortcomings.

First, although the author states correctly that half of the trainees did not return to the home country, he makes no attempt to address the probable cause(s) of this phenomenon. Therefore, I take this opportunity to humbly offer a few:

1. Corruption of the system at the national, political and social level;
2. Extensive bureaucracy;
3. Scarcity of the appropriate research facilities and logistics;
4. Low salaries; and
5. Low competence level of the potential supervisors.

Please note that some of the above were the same reasons which prompted those young fellows to take a postdoctoral training in the West.

The second caveat of the analysis is the fact that it does not offer any viable solution to the problem ["select employed candidates" (1) is not a viable remedy, because it deals with the symptom, and not the cause]. Since the author has been well aware of at least one of the proposed alternative approaches (2), it is surprising that he did not include it in the proper context of his article.

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A Contribution to the Discussion of the *Status Praesens* of the Biomedical Sciences in Croatia

[With a reference to the article of M. Marusic (1) and the letter of D. Vidovic (2) concerning the issues of a one-way migratory trend of the Croatian scientists.]

The Croats have developed a unique passion for the academic pursuits and contents, and learned individuals have always been placed at high positions in the traditional system of values (3). Throughout the centuries, academia has been considered the utmost professional achievement of an individual, together with the military profession. It has recruited the very cream of the crops in each generation. The Croats do not hesitate to express their national pride in the individual hall-of-fame achievements worldwide, not only in theology and philosophy, but in natural, technical and medical sciences as well (e.g., R. Boskovic, I. Lucic, F. Petric, F. Vrancic, L. Ruzicka, M. Demerec, N. Tesla, V. Prelog) (4). The children have been reared in the spirit of high esteem and appreciation of science and scholarly professions.

Due to 888 years of a colonial statehood history of Croatia, which terminated in 1990, the academic conditions were far from optimal ones. The long-lasting systematic foreign drainage of the Croatian national wealth left hardly a minimal coverage for the basic functions of the society. Such circumstances produced very little resources and security for the academic development and prosperity. However, despite the "bread line treatment" of the academic activities by the foreign colonial masters, the Croats have persisted in their idea of the necessity of human capital development. They have clearly recognized the human capital to be as important as the material assets for the development and well-being of the nation and society. Therefore, one might consider the procurement of the basic institutional framework of institutes, libraries, and learned societies, as a success within the given borderline resources, ever imminent to collapse.

The unfavorable historical circumstances have acted as strong centrifugal forces in the population. The lasting one-way migration produced the split of the national population corpus. Approximately one third to one half of the Croats (from a total of eight million) live outside the borders of Croatia. This fact places the Croats side by side to the Jewish and Irish ethnical entities in their unnatural world distribution. The academic professionals have followed identical migration patterns. The majority of the recognized achievements have been made abroad (4). There are very few opposite examples (5).

The recent history has been even less favorable to Croatia. The Croatian war for freedom against the Serbian and Montenegrin aggressors, which broke out in 1991, has additionally inflicted the academic community. The immediate war expenses justly became the absolute priority of the government. The scientific budgets were decimated, some scientific institutions were physically damaged or destroyed (6,7), and many academic professionals devoted parts of their life to the honorable service of meeting the specific needs of their homeland in the time of war. The indirect negative effect on the scientific research has been more extensive and will be felt much longer.

It is worth mentioning that, at the time of its international political recognition (February 1992), Croatia had been denied the accesses to the European funds for science and education in June 1991 (funds like TEMPUS, ALAMED). The European policy makers performed a supreme hypocrisy by that act which severed even the previously existing ties of the Croatian community with its European counterparts. This "frozen status" of Croatia is still in effect (May 1997). That was the most unusual way to treat the victims of war who defended their homes and homeland.

Both Mr. Marusic's paper (1) and Mr. Vidovic's reaction (2) express interesting aspects of the Croatian academic reality. They both contain particular elements of the general panorama, sometimes implying and/or claiming a causative association among the given phenomena. Even though one should not necessarily agree with the suggestive statements, those communications open a relevant discussion. The basic questions being asked are whether Croatia is going to continue exporting young promising professionals, and what are the mechanisms and pathways of establishing centripetal forces which might attract them back, and induce foreign scientists to seek their professional fulfillment in Croatia. Questions are rightly formed. Answers are to be delivered by both the academic community and policy makers. Several other authors have contributed to the analysis of the Croatian academic status (8-14). Some of them have offered important executive mechanisms for the improvement (8,10,14). According to the available scientometric criteria, approximately 20% of the scientists in Croatia produce recognized science with an identifiable impact on the international scientific community (11-13). The others are ignored by the secondary scientific indexing publications. Many of them prefer to communicate their results to the Croatian-speaking people only. In the light of all the exposed ideas, the policy makers may find the most relevant elements for the specific actions. A vast majority of the authors would agree that the principal disadvantage of doing a research in Croatia stems from a borderline support and a permanent financial insecurity of the research. The scarcity of the resources is mainly responsible for the growing delay, especially in the fast developing areas of research (e.g., molecular biology). The other relevant factor is the necessity of strict application of international standards as a measure of the scientific output. Such approach might catalyze a sound development of the scientific community, and systemic eradication of certain parascientific phenomena. Other factors (like those specified in references 1 and 2) might be considered as secondary phenomena, and not necessarily specific for Croatia and the Croatian academic community.

It might be of importance to remind the reader that Croatia regained its unshared sovereignty in the year 1991. The new political reality implies that Croatia has therewith become the sole master of its

national wealth, realizing the ancient dreams of the generations and generations of its forefathers. The Croatian society has reached maturity, which allows a dialogue between the partners. The dialogue between the policy makers (government, business sector) and scientific entities (universities, institutes) has already started, and some results are becoming visible. More and more policy makers design their visions of the society, highly placing science and scientific process. Applied research and technological development have become the focus of attention.

At the executive level, the Government of Croatia has recognized the historical misgivings, including the sensitive issue of postcommunist deviations in the academic community. It has adopted a strategy aiming to alleviate the problems concerning university, scientific institutes, as well as the relation between academia and business life. In 1996, Croatian Parliament approved the National Scientific Research Program (15), which is the first legal act systematically treating the governmental relation to science and technology. Science and technology have been given a decent share in the distribution of national wealth, with a relative increase every year. Development of the national academic research network (CARNET) and a direct access to international electronic information exchange is, surely, a gigantic advancement achieved during and despite the war. The Ministry of Science and Technology (MOST) has institutionalized a sound peer review system and minimal acceptable criteria in the evaluation of research programs and projects. Those criteria have been gradually applied. MOST has supported the foundation of technological centers as a new scheme of connecting the academia with the business sector. Along with the establishment of intergovernmental channels for the academic exchange with numerous countries, MOST has procured the access to several endowments and organizations (e.g., Fulbright, Fogarty, Humboldt, etc.). On the other side, the postwar revival of economy is expected to stimulate direct interactions, as well as to boost the scientific funds through the governmental channels. The inevitable increase in the economic performance, already experienced during the years 1993-6, infused the additional allocation to the scientific budget, which allowed the initiation of the first cycle of the scientific project support, with stable currency. However, it will take some time before the Croatian society reaches the economic power to induce a positive feedback loop with the scientific entities. If the necessary stable conditions for the scientific progress are secured, scientific creativity, the leading actor, will be brought into play. Croatian human capital, both abroad and in the homeland, and the academic tradition may be visioned as a reliable assurance of a real academic advancement, recognized by the increase in the academic output, as indicated by scientometric indices, technological patents, etc.

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Hic Rodos, Hic Salta!

I disagree with Dr Vidovic's statements (1) in every respect, just as I disagreed with his previous "advice" to the Croatian scientific community (2), but restrained myself from responding to it. However, the present Dr Vidovic's letter (1) is so inaccurate, and yet so accusing that I must react.

In general, Vidovic's five points regarding the status of Croatian science (1) are all incorrect. They might be applied, but only with due caution, to the time when he lived in Croatia – the time of communism. Today, the situation is changing.

1. The phrase "corruption of the system at the national, political and social level" is a wrong judgement and a rude expression, which has nothing to do either with scientific work or with life in general. Yes, we have inherited many egalitarian and unstimulating science policies from the past system (3), but much is being done to give research its place in the national program of development (4).

2. "Extensive bureaucracy" is a fact difficult to measure, although people in every country, especially intellectuals, complain of it. There may be a lot of bureaucracy in Croatia, but I do not think that it is more extensive than elsewhere, including the country in which Dr Vidovic lives.

3. Research facilities and scientific logistics in Croatia may be scarce for the US standards, but Dr Vidovic failed to state any quantitative argument in this respect. Normalization of data for the number of inhabitants and the gross national product (GNP) are the factors that should have at least been taken into account in such an argument. We would all like to have more and better research facilities in Croatia, but the present ones cannot be characterized as "scarce". Only in the field of immunology, with which Dr Vidovic is most familiar, there is a number of good laboratories: two in Rijeka, and five in Zagreb (Immunology Institute, Ruđer Boskovic Institute, University Hospital Zagreb-Rebro, School of Natural Sciences, School of Medicine). It is true that they can hardly be compared with NIH laboratories, but they are certainly comparable with the similar mid-European institutions.

4. It is true that our salaries are low, especially when compared with the salaries in the western countries, let alone in the USA. I shall say to this two things: (a) The one who respects himself, does not work for the money. (I wish to be cited for this sentence.); (b) A bit of mathematics: Dr Vidovic (and all those who agree with him), should calculate the ratio of my salary vs. the average Croatian salary, and that of Dr Vidovic's salary vs. the average US salary. Then, he will find that my ratio is higher, i.e., that, with respect to the social hierarchy, I am better off than Dr Vidovic. It is Dr Vidovic who is really underpaid; I just have a low salary. My salary is exactly in accordance with the GDP of the country in which I live, whereas his is lower than he deserves. As far as our social position is concerned, it cannot be compared at all: in this country, I am one of the most distinguished scientists, whereas he is just another guest worker in the USA.

5. I do not understand why an experienced scientist, like Dr Vidovic, would ask for a competent supervisor after his return from two up to ten years of training abroad. His own competence and independence are the very characteristics for which he had been sent for training and expected to demonstrate them after his return (5).

If that was his message, Dr Vidovic is right in implying that science in Croatia is much weaker than in the USA, Canada, or west-European countries, and that it will never be as strong, in absolute and in relative terms. However, if only that criterion was taken into account, every scientist in the world would do all possible to work in the USA, preferably at best research institutions. In other words, it is normal for a scientist to yearn for a better research environment, but he/she also faces limitations and compromises: one gets only what he/she can get, and for what he/she is willing to make sacrifices. Thus, some medical scientists end up working at most famous US research institutions, some at less great ones, others end up in clinical work, work in pharmaceutical industry, and – some return and work in their home country. This is a question of their priorities and abilities, and nobody should decide for them. But, if we have to discuss what is right and what is wrong (1), then again all the parties should be granted the same rights and the same freedom. In this respect, I assert that all the fellows whom I have sent to training abroad (5), and who did not return: (a) broke their solemn promise to me; (b) refused to accept excellent positions in Croatia which have been specifically offered to them, including accommodation and research facilities (6); and (c) achieved relatively less than those who did return. I also see that their life is not even remotely pleasant and fulfilling as it is of those who live in their home country, but that is beyond the scope of this discussion.

The postdoctoral fellows whose achievements I discussed (5), chose a training position abroad because – I offered it to them. The idea was to educate them so that they can become independent, mature scientists who could embark on a high-quality research after returning home. Those who returned did a splendid job in this respect, and none of them failed regarding either their ambitions or my expectations. Those who did not return can be divided into two groups. The first chose clinical work, which means that they left the research, i.e., the reason for their refusal to return home was outside science, so Dr Vidovic's argument of poor science in Croatia does not apply to them. The other group consists of 18 (out of 70) fellows who emigrated, and remained in the basic medical research. Dr Vidovic's discussion can thus be narrowed down to the question on why these 25% of fellows opted for continuing their research abroad instead in Croatia. According to all the information I have, their decision had very little to do with the conditions for the research in Croatia, but was associated with private and psychological matters. Most of them joined pharmaceutical companies, which brings us back to the material gain vs. academic achievement. They all refused the challenge to build and create their own facilities and teams, and thus betrayed the very idea upon which Dr Vidovic's argument is built: improvement of the conditions for scientific work in their home country. They also failed to make up for the investment of their homeland into their education (17 years of free education per person), and did rather little to assist their Croatian scientific colleagues even from the distance. After all this, Dr Vidovic warns us that our science is not good enough! It is his fault, not ours.

In conclusion, dear Damir, I will be frank: (a) considering the ratio of money invested in research and its productivity, those fellows who returned to Croatia produce more than those who emigrated; and (b) since you love *dicta et sententiae*, I will finish with the one containing the essence of our discussion (and more): *Hic Rodos, hic salta!*

Matko Marusic

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