

## The end of "periodisation" of training in top-class sport

by Juri V. Verchoshanskij

*Currently there are different points of view evident in the international methodology literature on the system of training. There are, in addition, various concepts and "schools" of preparing competitive sportsmen. This is quite understandable in such a complex phenomenon like sport but, to begin with, one has to consider two facts.*

*The first is a clear lack of general and fundamental papers on the scientific basis and methodical guiding principles of a theory of training.*

*Secondly, there is, to a certain extent, a conservatism in the understanding of training and its organisational principles, created by the primitive terminology used in the concept of the so-called "periodisation of training" which is still supported today by L.P. MATVEEV (1991, 1995). The author stated that there cannot be a universal structure of training, as MATVEEV had in mind!*

*However, there can be and has to be a uniform, scientifically justified, methodological approach to understand the nature of training and consequently also the tasks of the theory of training. On this basis, the actual system of training for a certain sport can then be developed.*

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### 1. Matveev's concept of "periodisation" as seen by the critics

The methodical principles of the current training systems were elaborated by Russian coaches in the early 1950's. At that time the USSR, or rather its athletes, were preparing for the country's first Olympic Games in Helsinki (1952) and other international competitions. The practical experience gained was then generalised and published (1965) in the form of a theoretical concept of "periodisation" of training by L. P. Matveev, the lecturer in the Theory of Physical Education at the Moscow Institute for Physical Education. At that time the concept of training theory was not a subject matter which attracted contributions from other experts, so the concept made quite an impact abroad. This was partly due to the fact that Soviet athletes were quite successful in the world arena and this paper was the first about a theory of training from behind the "Iron Curtain". The author therefore acquired the role of a training theorist for a long time.

The term "periodisation" gradually became the synonym of "planning of training". Many experts and coaches in the world today are still using the imaginary, theoretical terminology of the concept by tying in their competent and progressive ideas about the organisation of training to this straight jacket. In practice, however, "periodisation" has not found broad support - despite some notable individual supporters- and it has found itself confronted with criticism from within many quarters.

- Translated from the German original by Matthias Werner

Some experts are of the opinion that the outdated theses of "periodisation" do not meet the requirements of contemporary sport. They also believe that the theses do not take into consideration the improvement evident in athletes' functional reserves of the organism and therefore slow down the rate of improvement in performance levels.

It is also felt by many observers that "periodisation" does not represent the best model of training system for elite athletes. According to these critics it therefore has to be adapted at the very least to the characteristics of the modern competition calendar and to the international development trends of sport, and at best should be abolished. Some theses of "periodisation" can however, be applied with value in the development stages of age group training programmes.

It should also be emphasised that it is not characteristic of sporting practice to have a formal, mechanistic arrangement of the training year into periods and mesocycles. The principles of "periodisation" can neither be reliable nor universal, as they are exclusively founded on the study of a relatively short training experience with athletes at the beginning of the development of the Soviet training system in the 1950s.

Again and again it is critically emphasised that a training system should not be based on logic and empiricism, but rather on the knowledge of physiology.

In numerous publications the fact is stressed that the principles and methodical recommendations of "periodisation" are not specific and do not meet the requirements of modern top-class sport. This is especially true for the real situation faced in team sports, the endurance sports, in gymnastics, in the power events of athletics, and many more. Neither does "periodisation" give any fundamental and specific methodical recommendations for the improvement of special physical conditions or the competition preparation of single sports.

The strongest criticism of MATVEEV's "periodisation" comes from the experts of the cyclic (endurance) sports. At the moment it is particularly typical of these sports to have a very dynamical organisation of train-

ing loads throughout the yearly cycle and to show a gradual disappearance of elements of the traditional periodisation. In contrast, the (former) Soviet coaches have used the outdated methodology for a long time, so that increases in performance in some endurance sports have not taken place and do presently not take place, either.

The athletes were not able to build up and maintain their top form for the duration of the whole competition season, as the present schedule requires. One has to remember the fact that the success of the African (especially the Kenyan) athletes is not based primarily on altitude training and on genetical disposition, but on not integrating the idea of "periodisation" into their training system. They understood in time not to copy the European athletes.

In an article "Periodisation – plausible or piffle?" the English expert HORWILL (1992) analyses the reasons for its unacceptable ideas in modern running. He reproaches the servile bow to the theory of periodisation, as is the case with runners from the Western European countries. He points out that neither Soviet, nor Western European runners (male) have improved the World Record in middle distance running nor have they won a gold medal in the Olympic Games in the past 30 years.

The British runners, however, have achieved those performances, because they had not recognised the Russian concept of periodisation. The British runners started to use the structure of periodisation as advocated by Matveev only in the 1980s and, from then onwards their performances also showed a disturbing tendency to decline.

ZANON (Italy), was an internationally known expert of training theory in the USSR from 1960 – 1980 and he now insists on the necessity for a break away from this theory on scientific grounds. He claims that, if the training concepts are not founded on a biological basis, then the resulting training programmes will acquire a merely incidental relevance. He maintains that the Soviet theory is only based on theoretical terms without any relationship to the real improvements made in sport.

According to ZANON, a training theory on the basis of the Soviet doctrine of "periodisation" does not have anything to do with performances achieved by athletes at the present. He believes that although the theory attributes the progress made in sport to itself, there is, nevertheless, no scientific proof of its "mother role" and no direct link either.

I do not agree with all the arguments put forward by ZANON. The Soviet training system has developed, with the active involvement of myself and others, since the middle of the 1950s. ZANON affords a series of inaccuracies in the discussion of its history, as well as in the theoretical and practical relevance of "periodisation". He regards MATVEEV's concept as integral to the Soviet training system, partly because of its inclusion in the textbooks of the institutes of physical education. This over exaggerates its role and influence because only some coaches adhered to it.

TSCHIENE (Federal Republic of Germany) analysed a number of training concepts (1985) and discovered that that MATVEEV's "periodisation" had not changed since its original publication in 1965, despite the enormous progress in the practice of top-class sport and the scientific findings made since then. Many training doctrines had to make way for other, more up-to-date doctrines. He therefore argues that it is hard to understand why MATVEEV did not recognise this or rather did not want to recognise it, considering the growing difficulties in the use of his structural scheme in team sports and other disciplines. The theory of periodisation of the yearly cycle therefore has to be transformed or exchanged for a modern concept with specific and reasonable principles "in which the role of the competition exercise and the individualisation of training would be enhanced according to the international competition practice" (TSCHIENE 1990, 1991).

MATVEEV's textbook about "periodisation" (1966) was not translated into Italian; it was (later) rather critically reviewed in a special publication of the Comitato Olimpico Nazionale Italiano (CONI) and handed over to the sports associations, to the sports

physicians and provincial officials (BELLOTTI and others, 1978). Among other things, the aim of this critical analysis was to provide the coaches with "filtered" information that was revised and adapted to modern top-class sport.

What was particularly questioned was the reliability and practical efficiency of a concept that was only based on the training data of swimmers, weight lifters and athletes (runners) gathered from 1950 to 1960. Over a period of 20 years (i.e. five Olympiads), however, training methods have changed enormously and records have equivalently been improved. Many dominating "schools of training" and concepts, which served as the basis for the scientific research setting up new rules and modifications, have simply vanished and been replaced.

BELLOTTI and others (1978) particularly criticised the contrived character of the different micro and macrocycles and their complicated nature.

In Russia there has been even more categorical rejection of the "periodisation" theories. Kolessov, the former Vice-President of the State Committee for Sports in the USSR and an intimate expert in the preparatory problems faced in top-class sport, wrote that top-class performers "should not act according to the outdated system of our theorist, Prof. Matveev" ("Sovjetskij Sport", 24.7.1991).

Nevertheless, L.P. MATVEEV insists on his description and concept and refers to its growing international acceptance (1991, 1995). He brushes aside criticism of his concept as fashionable thinking and thus excludes any chance of a creative discussion about a further theoretical deepening of sports training (TSCHIENE 1991, 1992).

Such an inflexible position has to be seen therefore as the main cause of the problems faced in accepting the periodisation concept put forward by MATVEEV.

## 2. Reasons for the breakdown of the concept of "periodisation of sports training"

Today there is almost no sense anymore in analysing the theoretical shortcomings and

the clear methodical senselessness of the concept. Let us therefore only keep to the methodical insolency of "periodisation", to prevent similar theories being proposed in the future.

### The disregard of recent biological findings and achievements

The most serious mistake is the disregard of recent biological findings and achievements in sports science.

Today one does not have to convince anybody of the necessity of a "biological component" of the theory of training (VERCHOSHANSKIJ 1993, 1996, 1998). MATVEEV, though, does not hide his negative views on biological findings at all, and claims that biological laws do not determine the macro structure of training. He believes other laws control the athletic shape and makes a desperate attempt to view the process of sports improvement from the position of adaptation, and to acknowledge the priority of a "biological component" in the theory of training.

A simplified interpretation of adaptation leads, according to MATVEEV's view, to a "distorted idea of the laws of shape development" and proves to be its mere "biologisation" and even makes the theory of sports "less human" (MATVEEV 1991, 1995).

In some deference to the theory of adaptation, he admits that "the laws of the adaptive processes play a certain role in the organismic conversions that are caused by sports activity". However, the adaptation was only one aspect of increasing performance for athletes. According to MATVEEV, the theories of adaptation just have to be attached to his concept of training and then its principles have to be explained (MATVEEV / MEERSON 1984). "The priority in the interpretation of the process of sports improvement and the phenomena attached to it should not be given to the theory of adaptation, but the priority has to be given to the theory of development" (MATVEEV 1991).

This extract from Matveev's work shows that it is not a scientifically serious piece of writing and also highlights the impossibility of making "periodisation" any more academic.

### Lack of laws in the training concept

Within Matveev's theories of "periodisation", there is a confusion over terminology, laws, principles, guidelines, and fundamental theses. This mess is caused by a strange and hopeless search for laws in his concept of training structure.

The principles of training structure are, according to MATVEEV, "the generalisation of the vast, empirical material of sport", "it expresses the biological laws of adaptation and of sports training" (MATVEEV/MEERSON 1984). This is a rather strange explanation, because the training process, as everybody knows, has been constructed, so far, according to the subjective ideas of its contents, its structure and its chronological order in development. There are no "laws" (as strictly defined by science) at all. At best, one can talk about some methodical rules of training organisation that are worded according to empirical data, but nevertheless have a subjective origin.

The logical-speculative character of the ideas of training and competition, without any objective approaches, leads the concept of "periodisation" to the following claim of one of the "main laws" of training: there is an "inseparable connection of general and specific preparation of the athlete" (MATVEEV 1991). Without moving away from the desk, he added similar "laws", like "the continuity and cyclic character of training", "unity of gradual tendency towards maximal loads", and the "wavy shape of load dynamics" (1977;1996). At that time, however, it was already well-known that performance improvements in international competitive sport were connected with more radical and more complete factors than just "periodisation" (JAKOVLEV 1976; 1993; KASSIL and others 1978; SERGEEV 1980; VERCHOSHANSKIJ 1988; VIRU 1994; BOOTH 1988).

It is only natural that such a mess in "laws" also leads to a mess in "principles". Correspondingly, an analysis of 17 sporting text books for the Institutes of Physical Education in the USSR showed that its authors did not recognise the differences between principles of the training system,

the general-pedagogical principles and the special principles of training (GALKIN 1984). The inevitable variety of terminology eventually caused the appearance of 39 terms of similar principles.

Due to the lack of a scientific basis, the terminology of "periodisation" is full of contradictions and simply imaginary. Thus it cannot serve as a working instrument in the organisation of training, it only hinders the development of ideas about training and does not serve the education of coaches well (BELLOTTI and others 1978; HORWILL 1992; ZANON 1997).

### Disregard of biological adaptation processes

The speculative basis of MATVEEV's concept was founded on the developmental phases of athletic shape (top form). The term "dynamics of athletic shape" was adopted by both LETUNOV (1950) and PROKOP (1959). They belonged to the first group of sports physicians who put thought into words that the improvement of athletic shape is based on biological laws, which determine the development of the adaptation processes to the sporting activity. They structured this process into three phases:

- according to LETUNOV:
  1. improvement of athletic shape
  2. athletic shape
  3. drop of athletic shape
- according to PROKOP:
  1. adaptation
  2. highest athletic performance and
  3. readaptation

One gets the feeling that MATVEEV has not understood the biological sense of LETUNOV's and PROKOP's ideas and has therefore not been able to develop them. Because of this, he could not rise above a primitive "pedagogical" interpretation of the nature of training. He merely changed the name of these phases and so came to claim that the first-rate natural prerequisite for the periodisation of training lay in the various phases of the development of athletic shape. The production, preservation and loss of athletic shape of performers were operat-

ing "as the product of exactly defined impacts of training. The character of these training impacts changed regularly according to the developmental phases of athletic shape".

The athletic shape that is acquired at a certain level of sporting development of an athlete, is the optimal condition for a given level (and only for this level) of performance (readiness). To proceed, the old shape has to be overcome and a new one has to be acquired (MATVEEV 1965; 1977; 1991).

From the point of view of "the dynamic athletic shape" one can easily recognise that this idea about the nature of training is only the superficial image of a multidimensional phenomenon. Similar "scientific" descriptions of the 1960s strike us today as very naive. Today we realise that this notion of development of athletic shape takes the main prerequisite for the long-term improvement of performance in sport beyond its scope in terms of a need for a stronger increase in the functional organic capacity of the athlete.

MATVEEV has persistently ignored the numerous papers on the adaptation of the athlete to strenuous muscle activity in training and competition (JAKOVLEV 1976, 1983; SERGEEV 1980; VERCHOSHANSKIJ/VIRU 1990; VIRU 1994; NEUMANN 1994). He simply ignores the results of research on laws in the process of long-term performance build-up and morphologic-functional specialisation of the organism in long-term training; furthermore, he denies the trends in the dynamics of an athlete's shape with regard to training loads (VERCHOSHANSKIJ 1985; 1988). Matveev consequently refuses to accept the revelation of the objective nature, the sources, the dynamics and the quantitative characteristic features of perfection of the specific performance ability of athletes.

The notion of athletic shape was made into a dogma, but there has not been an explanation anywhere of the biological nature of the "thing itself". Consequently, MATVEEV brought what were, at the time, the progressive approaches of LETUNOV and PROKOP onto a scholastic level, without any

scientific foundation from the outset and thus without any perspectives in his concept (TSCHIENE 1991, 1992; SELUJANOV 1995; ZANON 1997).

### Making sports training pedagogical

The lack of a scientific and practical foundation to "periodisation" and the theory of training resting on it, is due to a disregard of biological findings and by an attempt to supply both to the general pedagogy.

Without doubt, the general pedagogy has a relationship to the theory of sports training, but it can neither be its scientific basis, nor its objective-quantitative criterion of training theory, nor can it be scientific method.

Hence pedagogy is in no respect any methodical-theoretical basis of the theory of sports training. A "pedagogical modus" of training theory freed MATVEEV (1995) from the demand for an unquestionable terminology, from the analysis of a rather difficult bibliographic survey on the problems of concept and on the use of precise quantitative data. This left the way open for him to theorise and make speculative judgements.

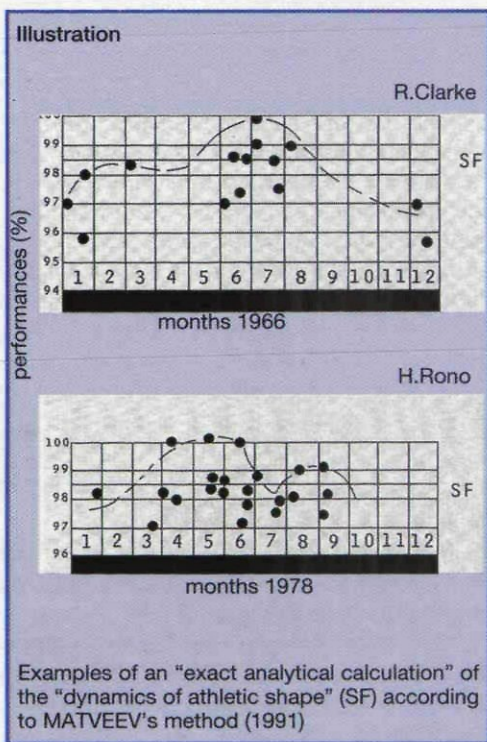
### Lack of scholarly standard

The method of the "concept of periodisation of training" is just as primitive as the method of the "fundamentals of sports training": It comprises so-called pedagogical observations, the registration of performances in some sports, long since outdated analytical-synthetic principles and the generalisation of practical experience in sport, "partly confirmed by research material and supplemented by theoretical considerations" (MATVEEV 1977; 1991).

For the purpose of acquiring a scholarly standard for these methods, Matveev also demands a thorough quantifying analysis to counter "subjective judgements" of his concept. This thorough analysis is expressed by the calculation of a lower limit of performances in the top form range of 1.5 to 2 per cent deviation from the personal best in cyclic sports and 3 to 5 per cent in acyclic power events. Below this limit the athletes were not "in shape". The calculation was simply carried out by drawing a connecting line between the performances (fixed as points) which could be assigned to a per cent-time-system, respectively to a date-system. The absolute personal best performance was equal to 100 per cent. From this a "regular wave pattern" of the changes in athletic shape was incidentally deduced. MATVEEV refused however to accept that whilst in athletic top shape a large number of the performances achieved are located below the critical range (figure 1).

Consequently today one can hardly talk about "wavy-shaped dynamics of athletic shape" as a research method of training. Although MATVEEV/MEERSON (1984) wrote about the importance of examining the connections "between the extent of training load and the degree of adaptive alterations in the organism", not a single example was mentioned, although there were plenty of them.

Arbitrary "laws" are deduced without any knowledge or information about contents and organisation of a particular training load and the importance of single competitions for specific athletes (as in the examples of Clarke and Rono in long distance running). Yet, both athletes did not know "peri-



odisation" and "the laws of controlling athletic shape" at all (SANABRIA 1988; JAKIMOV 1990).

A particular shortcoming of the method of MATVEEV's concept is highlighted by the low reliability and validity of the data material, from which the principles and laws were deduced. This especially refers to the analysis of collected data about volume and intensity of training loads which has been gathered in an unknown way. In time these naïve analysis results have been regarded as generalisations of practical experience. That is why such papers played an important role for the broader empiricism, methodology of training and for the thinking of coaches. Finally, the concept of "periodisation", which began life as a training aid in top class sport (1965), changed into a scholastic teaching discipline (1977), which estranged the author increasingly from the progressing practice and science of sport and failed to convince any knowledgeable reader in the subject. (SATORI/TSCIENE 1988; MICHAILOV/MINTSCHENKO 1988; TSCIENE 1990; MELLENBERG 1991; BALYI 1993; SELUJANOV 1995 and many more).

### **The principle of periodisation fails to meet the reality of training and competition**

The severe criticism of experts and practitioners refers to the nature of "periodisation" and its formal and mechanical classification of the training process into subjectively formed parts (cycles, phases, periods etc.). MATVEEV argues very clearly that the main value of "periodisation" of training lies within this very classification.

Due to the fact that sporting improvement could not take place outside the phases of acquisition, maintenance and temporary loss of athletic shape, the training process would have to be constructed in such a way that it would ensure an optimal regulation of shape unfolding. Periods and macrocycles would follow on directly from this and any other form of training construction would contradict the objective regularities (MATVEEV 1971).

The mechanical structure of the training process and its reunification of parts/ peri-

ods to something adaptive and whole has, firstly, little in common with the real organisation of training in most sport. Secondly, the unity of the objectively caused adaptation processes is given up or even destroyed. The possibility of an optimal regulation by the "trial and error" method is replaced by a subjective choice of different variations of training structure. The concept of "periodisation", though, does not offer strictly objective reasons for the choice of an optimal variation.

A formal compliance with the so-called "regularities to develop athletic shape" led to incorrect ideas about the tasks and the contents of preparation and competition periods, which have long since been apparent in sport.

The linear logic of the explanation of its tasks (training first, competitions second) simply did not correspond to objective reality, but gave coaches and sports scientists inappropriate information for a long time.

The preparation period served the "construction and calibration of athletic shape" by strenuous, preparatory work. The competition period was just set aside for competitions, and the "stabilisation" or "maintenance of athletic shape". By equivalent mesocycles the training shape of athletes was only carried out in the competition period; it was restored and maintained, but by no means developed any further. Such a primitive understanding of training periodisation does not correspond to reality.

In many cyclic events, and especially in team sports, the previously reached level is not only maintained, but also developed. Taking the theory of adaptation a stage further, the main task of the competition period consists especially of finishing a dynamic cycle of development within the long-term adaptation of the organism to a specific movement regime and its rise to a new solid level of specialised functional possibilities.

At this point, one has to pay attention to the lengthening of the competition period and the increasing number of important (international) competitions in contemporary competitive sport. To give the example of cycling, the duration of the season has risen to between 8 and 8.5 months. The

preparation period cannot therefore be long enough for a "fundamental preparation", so the main development of training shape and athletic shape takes place within the long competition period.

The formal separation of the preparation and competition periods and consequently the fixing of specific tasks leads coaches and athletes in the wrong direction. The tasks of preparation in the yearly cycle of training cannot be solved correctly, as the objective situation demands. That means, the strategy of training organisation becomes distorted and thus the natural course of the adaptation processes as a basis of performance improvement is disturbed.

### **Arbitrary arrangement of the training process**

The technology of training structure proves to be the poorest part of the concept of "periodisation". According to MATVEEV the idea of "periodisation" is simply to string together the single parts of the training process. The basic structural unit is the microcycle, therefore the training process consists of a chain of microcycles whose logical linear order is simply produced arbitrarily. A variation of the single types of microcycles with various linkages forms the greater part of the training process – the "mesocycles" – and they in turn form the "macrocycles".

For the realisation of such a linear principle MATVEEV (1971, 1977) suggests a whole series of mesocycles with different names, like for instance preparatory mesocycle, fine-tuning mesocycle, competition mesocycle, and others. Each mesocycle comprises three to six microcycles but it is not known how this allocation is arrived at. The "real variability" of training structure is achieved by different arbitrary combinations and wavy rearrangements in the sequence of the named mesocycles for both the preparatory period and the competition period. The reasons, arguments or recommendations for such chains of mesocycles and their optional duration cannot be found in MATVEEV's work.

Research which set out to confirm the absoluteness of "periodisation" (SUSLOV and others 1986) has not been successful but has

highlighted the primitive character of the planning technology. At the same time it was also convincingly proven that in practice the principles applied were totally different from the speculative recommendations of "periodisation".

### **Ignoring the principle of adaptation**

Another major shortcoming in the concept of "periodisation" can be seen in the fact that it only knows two regulation methods for quantifying training loads, namely intensity and volume. For this reason (apart from the naive idea of a wavy shape of the total extent of the load), load volumes were massively increased in an attempt to increase the efficiency of training because of the dominance for years of the principle of "periodisation". That was the reason for an extensive (quantitative) development not only of the training methodology, but also of the complete preparatory system of competitive athletes (TSCHIENE 1990; 1991).

The most important characteristic of adaptation was not realised, namely the transformation of qualitative features of external developments into inner characteristics of the organism (JAKOVLEV 1976; VERCHOSHANSKIJ 1988; VERCHOSHANSKIJ/VIRU 1990; VIRU 1994).

Ignorance of the specific character of the adaptive changes in the organism (probably due to a lack of knowledge) lead MATVEEV to wordy reflections about the so-called "transfer" of skills and physical abilities (MATVEEV 1991). This phenomenon exists, but not in high-class sport. It is for example not acceptable to say: "there are many cyclic locomotoric exercises which are distinctly different in form (running, swimming, cross-country skiing, cycling, etc.), but which are nevertheless extremely close to the character of endurance and other biomotor abilities in their holistic competition exercise" (MATVEEV 1971).

MATVEEV's concept is untenable considering the fact of the organism's specific nature of adaptation to the stimulus of training. That has been known for a long time and is a very important criterion for the selection and organisation of training loads.



Presently load volumes have reached a limit that can still be called reasonable. The possibilities of developing new exercises of specific preparatory conditioning have been remarkably diminished. The load regulation of the specific training influence remains the only way to increase the training efficiency in top-class sport. Reflections about a "transfer", as well as about a greater role of the general preparatory conditioning in top-class sport dates back to the 1950s.

The ignoring of numerous bibliographic references concerning the physiological mechanisms of specific training influences is a further shortcoming of the concept of "periodisation". Unfortunately this flaw is practically expressed by a vast amount of time and energy being expended on little effective training gains by athletes. This has resulted in the failure of training planning that has been aimed at top performance.

### 3. Conclusion

- Four cardinal errors deprive the concept of "periodisation" of training of its theoretical and practical relevance:
- poor understanding of the sport itself, of the technology of preparation of top athletes and of the coaches' specific knowledge and abilities.
- the primitive approach of the methodological concept, theories proposed without any objective basis of terminology, merely speculative methodical principles and the lack of objectively well-founded, practical recommendations.
- the disregard of biological knowledge
- a lack of uptake of knowledge from related sciences and of findings from the training medium.

The coach who organises and leads the process of cardinal reorganisation of all their athletes' vital systems bears a high moral responsibility for their health and future. But if the coach does not know, at this point, what is going on in the athlete's organism and is only led by pseudo-pedagogical torrents of words about "periodisation" or the "laws of regulating athletic shape", then the athlete and the sport at large will have a very narrow perspective and little scope for real, sustained development. ■

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