My First Half-Century in the Iron Game

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During the last twenty-odd years, a lot of pure hogwash has been published on the subject of supposedly "secret" training methods developed by the Russians, and it is certainly true that Russia has produced some outstanding weightlifters; but they did not produce them as a result of any secret training methods. Given a very large population, given both the opportunity and encouragement to train, it would be surprising if at least a few outstanding individuals failed to appear.

I was in the audience in Columbus, Ohio, in 1970, when the Russian heavyweight lifter cleaned and jerked 500 pounds for the first time; but it seems to have been overlooked that a much smaller man (from Belgium, I believe) immediately afterwards lifted an even heavier weight, and did so in spite of the fact that he appeared to be about 150 pounds lighter than the big Russian. This lift went unrecorded because he "lost it," got the weight to arms length overhead but then lost his balance and dropped the weight; but he certainly lifted it.

And if you are really interested in outstanding weightlifting records you should look someplace a lot closer than Russia; try DeLand, Florida. In the state of Florida, weightlifting has been a competitive sport at the high-school level for more than forty years, while all Florida high schools do not have weightlifting teams a lot of them do. But, prior to 1972, the DeLand school did not.

Mentioned in an earlier article in this series, during the summer of 1972 we conducted a research program in an attempt to determine the value of a "negative only" style of training, and the results were outstanding; this training was performed in a gym that I built for the DeLand high school, a gym that was equipped with a full line of Nautilus machines and about a dozen Olympic barbells, together with thousands of pounds of barbell plates.

Having been fired from his job as the DeLand football coach because his team lost all of their games during the previous season (losses that were not the fault of the coach, but that is a matter I do not wish to mention), a man named Bill Bradford was looking for another sport to coach; at the time I doubt that he really knew the difference between a barbell and a palm tree, but he was not stupid, and he saw the results that we produced with negative only exercise. So he started a weightlifting team.

Seven years later, more than 100 weightlifting meets later, his team was undefeated and untied; within a matter of a few months after they started training, he had boys in their middle teens who were benchpressing more than double their bodyweight. And how did he train his lifters? Negative only. Two weekly workouts with only one set of each exercise, with from six to eight repetitions in each set. This record is probably unprecedented, in any sport.

At that point I told him … "Stop while you are ahead; you have already set records that will probably never be equaled, but if you continue then eventually you will lose through no fault of your own, a bus will run off the road on the way to a meet, or a bad outbreak of the flu will hit your team members, or something else will happen to break your winning streak, so quit now."

And he did quit. A new coach took over and promptly started losing. Why? Because he went back to using conventional training methods, stopped using the negative only exercise that Bradford used.

And having been regularly trounced by Bradford's team for seven years, how many other coaches adopted his training method? None. Why not? Damned if I know; but I do know that it is impossible to explain insanity, and I will not try to do so. If it could be explained it would not be insanity. But it can be recognized for just what it is.

Twenty-one years ago, when we performed the initial research with a negative only style of training, I did not know why it worked so well; but I do now. And I also now understand just why a very little of such exercise goes a long way; done properly, negative only exercise will produce outstanding results, but it is easily overdone, very quickly leads to overtraining.

Earlier articles in this series have mentioned muscular friction, but I am not finished with that subject yet. Internal friction in your muscles reduces your positive strength but increases your negative strength; when you are lifting a weight your muscles must produce enough force to overcome the resistance provided by the weight, but must also provide enough additional force to overcome the internal friction; but when you are lowering a weight (negative work) the internal friction helps you rather than hurting, makes you stronger.

Positive strength is equal to force of muscle contraction minus internal muscular friction. Negative strength is equal to force of contraction plus muscular friction.

When maximum positive strength of fresh muscle is 100, then the negative strength will be about 140, provided only that the movements are performed fairly slowly. But in fact the actual force of muscular contraction will be 120 in both cases. 120 minus 20 equals positive strength, while 120 plus 20 equals negative strength. Assuming fresh muscles in all cases.

But the friction found in muscles is not consistent, does not remain at a constant level; muscular friction is increased by a faster speed of contraction and is increased by fatigue.

And it should also be noted that the speed of muscular contraction is not steady even when the speed of movement remains constant. Starting with your arm straight at the elbow, if you bend your arm at a constant speed (any speed so long as it is constant) during the first 90 degrees of movement around the axis of the elbow, the speed of muscular contraction will vary in excess of 800 percent, which means that the speed of contraction is nine times as fast in one position as it is in another position during the same movement. And thus the internal friction is much higher in some positions that it is in other positions; which factor also influences your strength, produces some of the variation in strength that is seen in almost any full-range movement.

While at first glance it might not appear to make sense, it is nevertheless true that it takes exactly the same amount of force to lower a weight as it does to lift a weight or hold a weight.

Think about it for a moment: when you are lifting a weight at a constant speed (any constant speed) the force is exactly equal to the weight. If the force was higher, the speed would increase, and if the force was lower the speed would be reduced and the weight would eventually stop moving upwards and start to move back down.

The same thing is true when lowering a weight or holding the weight without movement either up or down.

To accelerate a weight (increase its speed of upwards movement) you must produce a force that is higher then the downwards force of gravity that is acting upon the weight. If you perform a set of ten repetitions of the bench press, and if you lift the weight as fast as possible during each repetition, you will find that the speed of upwards movement becomes slower from one repetition to the next, and eventually you will be forced to stop, are momentarily incapable of producing upwards movement.

At that point you cannot lift the weight, but if somebody will lift it for you then you will find that you can easily lower the weight at a slow and constant speed. And remember: it takes as much force to lower a weight as it does to lift the same weight. Yet you cannot lift it but you can lower it. Cannot lift because the friction is reducing your positive strength, but can lower it because the same friction is increasing your negative strength.

If you measured the level of friction when your muscles where fresh, and measured it again after a hard exercise, you would find that the exhausted level of friction was much greater than the fresh level of friction.

When an exercise is continued to a point where additional movement is momentarily impossible, even with no resistance against such continued movement, when you are literally momentarily paralyzed by fatigue, your level of positive strength will then be zero; but your simultaneously coexisting level of negative strength will then be nearly as high as it was when your muscles were fresh.

If your fresh levels of strength were positive 100, negative 140, and static 120, and if you then worked to a point where your positive strength was reduced to zero, your remaining static strength would be 60 and your remaining negative strength would be 120. Fresh positive strength would be reduced by 100 percent, but negative strength would be

reduced by only about 14 percent, while static strength would be reduced by 50 percent. You would also find that the fresh level of friction had been increased from 20 to an exhausted level of 60; friction is then equal to the force of contraction, a force of 60 minus friction of 60 has reduced your positive strength to zero, but a force of 60 plus friction of 60 will give you a negative strength of 120.

At the end of a hard set of an exercise that is continued to failure, your remaining positive strength is not zero; instead, has been reduced to a point that is momentarily slightly below the level of resistance being used. You then cannot continue with that amount of weight, but if you reduce the weight you can continue.

Most people, if they can perform only one repetition with 120 pounds, will find that they can perform about ten repetitions with 100 pounds of resistance; and upon reaching a point of failure, they have reduced their fresh level of positive strength from 120 to a momentary level a bit less than 100. Even if their remaining strength is then 99 they cannot continue, because a force of 99 cannot lift a weight of 100.

So the fatigue from such an exercise reduces your fresh positive strength only about 17 percent, from a fresh level of 120 to an exhausted level of perhaps 98.

In order to reduce your remaining level of positive strength to zero you would be forced to perform several sets of the exercise without rest between the sets and while reducing the level of resistance from each set to the next; continued long enough you would find that such exercise would cause so much fatigue that you would eventually be unable to continue even with no resistance.

And it would probably take you two weeks to fully recover from an exercise carried to that point; performed frequently, such exercise would produce rapid losses in both muscular size and strength.

Such exercise, performed in the usual fashion, involving both positive and negative work, would probably required ten or fifteen sets of the exercise in order to reduce your positive strength to zero. But when using a negative only style of training you can reach that same level of fatigue from only one set of the exercise; the enormous increase in muscular friction that is produced by fatigue will permit you to continue the exercise long past a point where you should have stopped, will produce so much fatigue that it will take you a long time to recover from it.

Negative only exercise is not practical with most exercises, because it requires the help of several people to lift the weights so that the subject can avoid the positive part of the work, and is also a rather dangerous form of exercise because of the risk of dropping the weight, the helpers may release the weight before the person performing the exercise is ready for it, in which case the weight will fall and an injury may be caused.

In a few cases it is possible to perform negative only exercise without help: in a chinning (pull up) exercise you can use a ladder that enables you to reach the top position without the need to pull yourself up, then slowly lower the body to the bottom position in a negative only style. But that is an exception, not the rule.

Because of the potential benefit of negative only exercise, and because of the problems usually associated with it (primarily the need for helpers), we introduced what we call “Negative Accentuated” exercise over twenty years ago, and this is perhaps the best style of exercise that is practical.

Unfortunately, this style of exercise cannot be performed with a barbell, and cannot be performed with all exercise machines, but can be performed with some exercise machines. With a leg-extension machine, for example, negative accentuated exercise can be performed by lifting the weight with both legs (the positive work) and the lowering the weight (the negative work) with only one leg. Up with both legs, then down with the right leg only, up with both legs again, then down with the left leg only. The positive part of the exercise being performed by both legs working together, but the negative work being done by only one leg at a time.

When such an exercise is performed in the usual fashion, with both legs working during both the positive and negative parts of the exercise, you would usually exercise with about 80 pounds of resistance if your fresh level of strength was 100; and when you failed at the end of this exercise your remaining level of strength would be slightly below 80. But when the exercise is performed in a negative accentuated fashion, you would use a lower level of resistance, perhaps only 50 pounds of weight instead of 80; so the resistance would be lower during the positive work with legs working

together, but would be higher during the negative work performed by only one leg. A point of failure will be reached when it becomes impossible to lift the weight with both legs working together; so you will have reduced your fresh level of positive strength by more than 50 percent, rather than by only about 20 percent that would come from exercise performed in a usual fashion.

A much higher level of fatigue from the exercise, and thus greater stimulation for growth; but because of this much higher level of fatigue the frequency and extent of such exercise must be reduced, never perform such exercise more than twice each week, and never perform more than one set of the exercise during each workout. More is not better in this case, and you literally cannot stand much more than indicated above.

During negative accentuated exercise the weight should be lifted smoothly and fairly slowly, lifting the weight, do not throw it, pause briefly in the top position and smoothly hand off the weight from two legs to only one leg, and then slowly and smoothly lower the weight back down with one leg. If you can lift the weight with both legs more than ten times, then increase the resistance; a proper point of failure has been reached when you can no longer lift the weight with both legs, which should occur after about ten lifting movements.

A great deal of dangerous hogwash has been published on the subject of the proper speed of movement during exercise; fast movement during exercise does not produce fast muscles, or strong muscles, or large muscles, it produces only one thing, a thing to be avoided, it produces injuries. The next time somebody tells you to move fast during exercise, smile and walk away, you are talking to a fool. Ken Hutchins has been publishing a lot about what he calls “Super Slow” exercise, which is carrying the situation much to far; it is not necessary to move as slowly as he would have you believe. All that is really required is a speed of movement that is slow enough to prevent throwing or jerking the weight, and changes in the speed of movement should be performed smoothly and rather slowly, any sudden change in speed of movement will cause high levels of impact force that can easily result in an injury.

Hutchins recently published a “news letter” in which he made several untrue statements regarding both himself and me; among other things he quoted statements that were supposedly made to me and by me at a meeting of the American Academy of Sports Medicine in 1978, statements that were not in fact made. Hutchins was not at the meeting, and I have tapes of everything that was stated by everybody who was there.

In the same paper he also claimed that he was the one who originated a counterweighting system to compensate for torque that is produced by the force of gravity acting upon the mass of the involved bodyparts; which is an outright lie, such counterweighting was introduced by me.

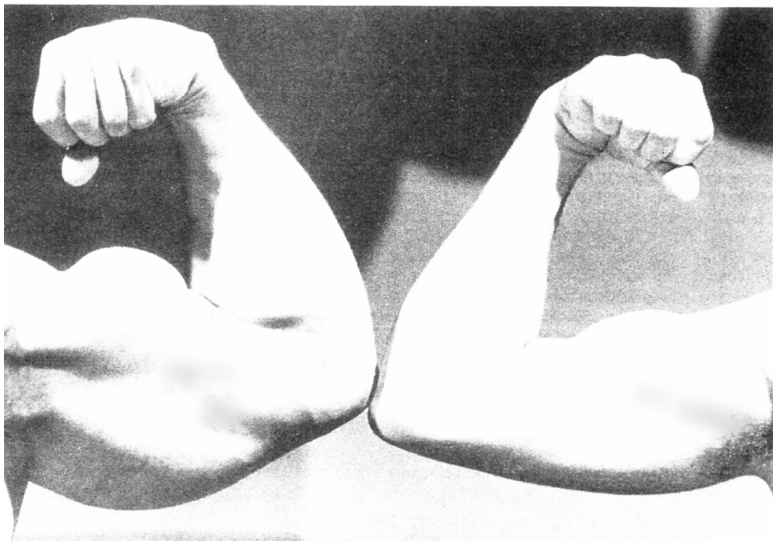
In an earlier paper he claimed that he was the first person to understand, or even be aware of, the effects of muscular friction; and that is another outright lie, what little he knows about muscular friction (if anything) he learned from me, I published an article on that subject in the Athletic Journal nearly twenty years ago, an article titled “The Metabolic Cost of Negative Work.” An article that was reprinted in a book of my early articles that was published (with my permission) by Dr. James Peterson in 1975.

Hutchins also tries to give the impression that he was directly involved in the development of prototype machines during the time that I was operating Nautilus (from the start in 1970 until I sold the company in 1986); but in fact he had absolutely nothing to do with prototype development during that period, and while he may have hung around the prototype shop after I sold the company it should be noted that absolutely nothing new was developed there after I left. Prototype development that was performed after I sold Nautilus occurred in a new prototype facility that I built in Ocala, Florida, and Hutchins has never even visited this new facility.

But it should also be noted that Hutchins is not the only liar in this field, I could give you a very long list of others.

Unfortunately, most of the millions of people who are now interested in exercise are too young to even be aware of the true history of this field, do not know who to believe or what to believe, remain unaware of the many outrages that have occurred during the last fifty years or so in this field, many of which outrages are still occurring.

Outrages? You’re damned right: isokinetics, plyometrics, power cleans, any sudden movement against resistance, jump squats and a long list of other things that provide no benefits whatsoever and are dangerous as hell.



Most of the scientific community is firmly convinced that the strength of a muscle is in direct proportion to its cross-section, and this may be true in one sense; but it does not follow that increasing the cross-section of a muscle by 100 percent will produce an equal increase in strength. A larger muscle will be stronger than it was when smaller, but you might have to increase the muscle's size by more than 200 percent in order to increase the strength by 100 percent. Look carefully at the following illustration.

The larger arm in this picture belonged to Boyer Coe (Mr. America of 1969), while the smaller arm belonged to my son Gary. Accurately measured, "cold," Boyer's arm was 18 7/16 inches, while Gary's was 14 3/8 inches, a difference of 4 1/6 inches; Boyer's arm was about 28 percent larger than Gary's in circumference. But the width of Boyer's arm was 43 percent greater than Gary's, while the total cross-section of Boyer's arm was almost exactly twice as large as Gary's, and the muscular cross-section of Boyer's arm was three times as large as Gary's.

At the time this picture was taken, Gary could curl a barbell weighing 120 pounds, in good form and without swinging or throwing the weight; but Boyer damned sure could not curl three times that much, 360 pounds. Even though his muscular cross-section was three times as large as that of Gary.

Why not? Because, as a muscle becomes larger, the "angle of pull" changes; only the exact center of a muscle is pulling in the right direction, and any part of a muscle that is to either side of or above or below the exact center of the muscle is pulling in a slightly different direction, some of the force then produced is wasted because the direction of pull is somewhat wrong. And the larger a muscle becomes the greater the change in the angle of pull.

So a muscle that is twice as large may in fact produce twice as much force, but a large part of that increase in force will be wasted because it is pulling in the wrong direction.

Which means that an increase in strength has also produced an even greater increase in muscular size.

Judging your increases in strength by comparing your performance during one workout to that during a later workout can be done with a reasonable degree of accuracy, but several things must be understood in order to produce meaningful results.

If you can perform only ten repetitions with 100 pounds, and later can perform eleven repetitions with the same weight, then your strength has increased, but it has not increase by ten percent. A ten percent increase would be indicated only if you did ten repetitions with 110 pounds during the later workout, and then only if the style of performance was exactly the same both times.

Moving faster, or moving slower, during the movements will also effect the number of repetitions that you can do; so a meaningful comparison of an earlier performance to a later one can be provided only if the speed of movement is the same each time.

A proper style of performance, or "form," is one of the most important factors in exercise, and yet is generally ignored and is seldom really understood. Good form during exercise is frequently the only difference between very good results and no results at all, or good results on one hand and injuries on the other hand.

Bad form during exercise usually results from trying to lift too much weight or trying to do a few more repetitions after having reached a point of failure; if you cannot move the weight smoothly and fairly slowly, do not start jerking in an attempt to continue.

A friend of mine remarked a few years ago that Kenneth Cooper (the originator of aerobics) … "Will probably go down in history as the man who destroyed America's knees, rather than the man who saved America's hearts." Now the dangers of "high impact" aerobic exercises are finally beginning to be noticed; yet many of the same people who eventually became aware of that danger are still telling people to move suddenly during weightlifting exercises.

During a supposedly scientific meeting about twenty years ago, Gideon Ariel told the audience about the dangerously high level of impact force involved in jogging, and there was a great deal of interested attention in the audience; then, about twenty minutes later, he recommended jump squats as a safe and productive form of exercise. The level of impact force during jogging is usually about three times as high as the subject's bodyweight, but with jump squats it may be fifty times as high as bodyweight; so if jogging is dangerous, how in the hell can jump squats be safe?

Yet, not a single person in the audience apart from me apparently noticed the utter inconsistency between the two statements. Were all of them really that stupid? Or were they simply afraid to speak up? Probably both stupid and afraid.

Apart from things like burns and radiation, all injuries are a result of the relationship between only two factors; force and structural strength. When a level of force that is above the coexisting level of structural strength is imposed then an injury will be produced, something will break. And since the only way you can determine the level of structural strength is by exceeding it, thereby producing an injury, you should keep the level of force as low as possibly consistent with the requirements; lift as much weight as you can for the proper number of repetitions, but only with smooth and fairly slow movements. Moving fast or suddenly will increase the level of force enormously, to no good purpose.

Competitive weightlifters must move fast, and a very high percentage of them end up with very serious injuries; but for either strength-increasing or bodybuilding purposes there is no need for fast movement.

Ignore this clear warning at your great peril; move fast during exercise and you will eventually hurt yourself, I promise you. Train properly and you will probably never hurt yourself.