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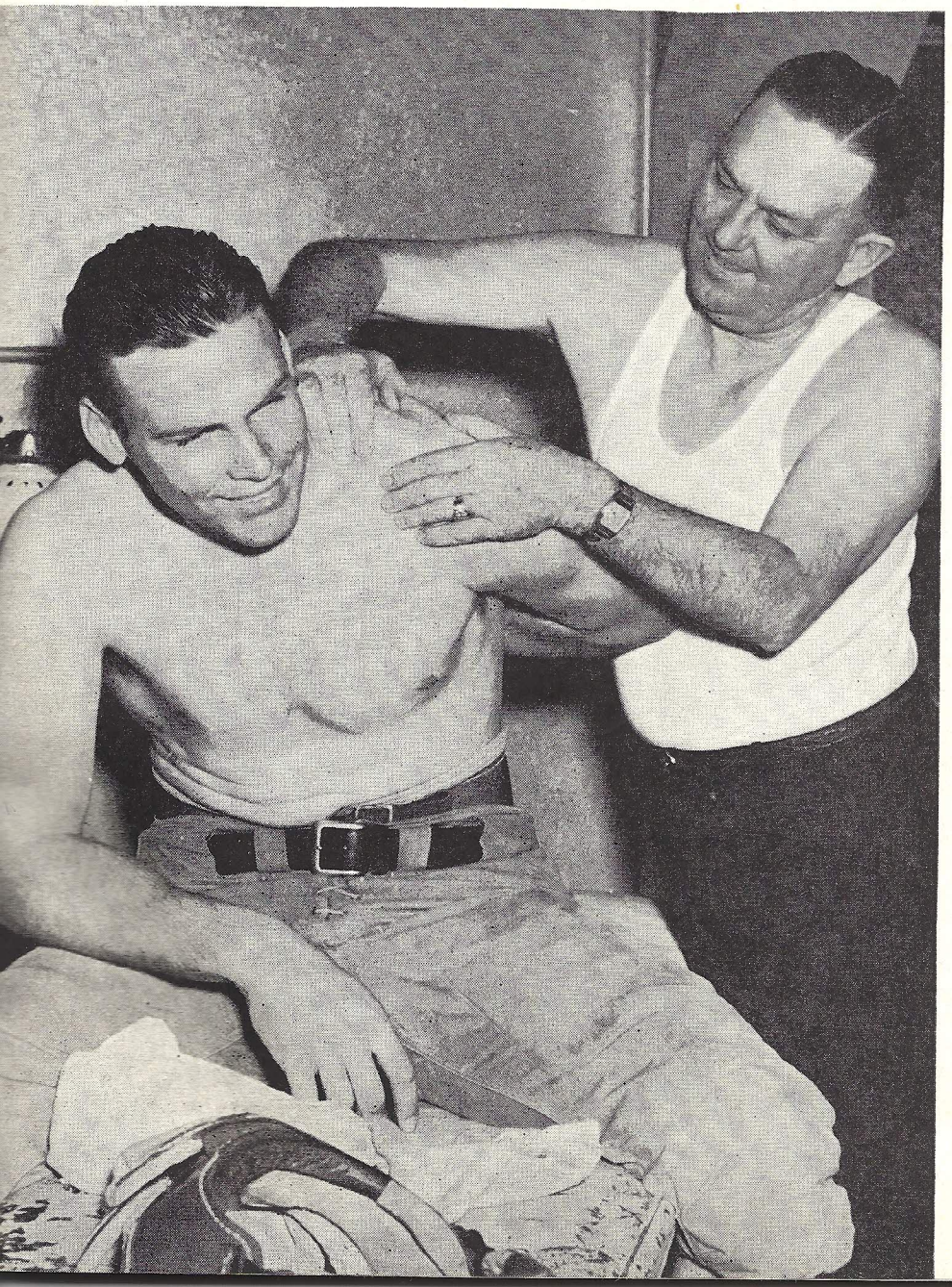

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Excellent conditioning and training are given the athletes at Texas A & M by Athletic Trainer "Lil" Dimmitt.

The Fundamental Principles Underlying Training Rules

By W. W. Tuttle
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FOR the most part, well-defined training rules have proved to be essential in the preparation of athletes for strenuous competition. This is true because the wisdom and experience of many competent coaches and skilled athletes are incorporated in them. We sometimes, however, lose sight of the fact that each rule which is essential has sound scientific facts behind it. Sometimes, the evidence substantiating some of the elements of the training rules is clear; sometimes, it is somewhat obscure, and at other times there appears to be no good reason for some of the routine required. Nevertheless, in the training program we must accept the fact that there are necessary procedures which involve elements beyond the reach of laboratory demonstration. In the last analysis, the proof of whether a procedure or technique is useful, and should be retained in a training program, depends on the results yielded by its practice. If it makes an obvious contribution to the performance of the athlete, it must be scientifically sound in principle. In general, trainers and coaches are in agreement with scientists on the principles underlying sound training. There are naturally differences of opinion, however, as to the details involved in acquiring techniques and efficiency.

Training Rules and Habit Formation

Training rules are designed to provide conditions which are conducive to the best possible athletic performance. Their main purpose is to develop useful modes of action which can be carried out more or less automatically, that is, to establish good habits. We have been used to thinking of habits as fixed and invariable units of activity. But we have come to recognize the fact that no two habitually performed movements are exactly alike. Even the simplest actions are adapted to the details of the specific situation in which they occur. Habits then, have been defined as the smooth and ready co-ordination of certain elements of response. Thus in passing a football, there is a smooth and ready sequence of movements which tends to occur automatically. If the throwing form is satisfactory, the player can devote all his attention to the timing, speed and direction of the throw. If the mechanics of the throw are not satisfactory, more time must be devoted to the development of new throwing habits.

It is just as important to establish good habits in the routine of daily living, as it is in connection with athletic performance. The athlete in training should never have to ponder over the problem of what to eat, and when to eat it, what type of bath to take, and when to take it, when to go to bed, and when to arise in the morning. These problems should be solved by establishing the necessary habits, so that the reactions to all these situations are largely automatic. Good habits not only make for good performance, but also for more efficient living. This is true because routine becomes automatic, and it is only when it becomes necessary to deviate from the general plan of action that the athlete must decide on new procedures.

The Exercise Program

The most important part of athletic training has to do with developing proficiency in a chosen sport. Since college men must carry a full load of classwork, the element of time is an important consideration. Thus, it is necessary to make a close tie-up between the general conditioning program and the program designed to develop skill and team play. A basketball player must devote most of his practice time to playing basketball rather than participating in other types of exercises, although they may be excellent as a means of promoting good physical condition. By playing basketball, he not only develops from the standpoint of condition and endurance, but also he makes improvement in agility, speed, and ability to change direction quickly. At the same time, the techniques of the game, and of team play are developed.

From the standpoint of time, the athlete has a problem which must be well recognized by everyone involved in the sports program. Since scholastic requirements must be met, the exercise and conditioning program must come in second place. This being the case, the greatest economy may be gained in reaching proficiency in a sport, if the athlete confines his exercise to the sport itself, unless there are other forms of activity which contribute so much to success in his sport that he cannot afford to neglect them. It is on this basis that arm strengthening and ankle flexibility exercises may be justified for swimmers. It should be understood that we favor general conditioning and special developmental exercise, yet in the case of college athletes, the time element scarcely permits the development of an ideal conditioning program.

Sleep, Rest and Relaxation

Because of strenuous and prolonged exercise, the athlete gets so tired that he needs more time than the average person does for sleep, rest and relaxation. Instead of getting the necessary rest after strenuous exercise, the athlete often tries to study. But like anyone else, he is mentally inefficient after fatiguing bouts of exercise. The result is, that he does not do good scholastic work, and some may even go so far as to call him stupid. Studies regarding the scholastic attainments of athletes show that stupid people are no better as athletes than they are as students.[1] The difficulty is in balancing the rest, work, and study programs.

Since the athlete must budget his time more carefully than the ordinary student, he must develop time-saving habits. Regularity of performance, whatever the act may be, is most important. The athlete must learn by experience, how much sleep he requires, so as to be alert, and have zest for his daily routine. After he learns this, sufficient time must be arranged to get the required amount of sleep. A sleepy student will gain more in the long run by sleeping than by trying to listen to a lecture, or reading a book.

Rest habits are as important as sleep habits. Almost everyone can find short intervals during which rest may be had, if the individual has learned to rest. The secret to effective rest, as well as economy in sleeping, is to be able to relax promptly. Since this ability may be gained by practice, the athlete should cultivate the habit of prompt relaxation.

Proficiency in athletics, as well as in anything else, may be gained only when the athlete has zest for his sport. In order to have this zest, the participant must not only be in good physical condition and well trained in the technique of his chosen sport, but he must be rested and relaxed as well.

The Daily Routine

If an athlete is to adjust his daily rou-

1 Tuttle, W. W. and F. S. Beebee. A study of the Scholastic Attainments of Letter Winners at the State University of Iowa. *Research Quarterly* 12:174-180, May, 1941.

tine of living to the requirements of the training program, the first prerequisite is that he have sufficient interest in his sport. In the second place, he must be convinced that the requirements are not mere fancy, but that they are based on facts which are scientifically sound. When an athlete begins to doubt the usefulness of some of the training requirements, his observance of training rules becomes more difficult, due to this element of doubt.

It is granted that there are some elements in the training programs that are difficult to defend, partly because of their traditional use, and partly because of a paucity of scientific data to support them. To illustrate, let us consider the question of diet. For a good many years, our lack of scientific knowledge relative to foods and accessory elements of diet was reflected in training diets. Menus were carefully selected, certain types of food were marked as undesirable and hard to digest, while great emphasis was placed on the special value of other foods. As we learned more and more of the facts concerning foods, the athlete's diet was placed in the same category as that of any individual doing strenuous work. During the period when such accessories to the diet as vitamins were under scientific scrutiny, they were misused because of the prevalence of erroneous ideas and theories. But now we are certain that the eating habits of the athlete present no more of a problem than those of the farmer. The trainer only needs to be sure that access is had to sufficient foods of wide enough variety to meet the requirements of normal active individuals.

Bathing habits serve as an example of misuse due to tradition. We know that the bath may serve either as a means of washing away dirt, or as a therapeutic measure for altering physiologic function. When athletes of some experience are told that, ordinarily, they should confine their baths to tepid showers, they sometimes question such a procedure, for it has been common practice to start with hot water and finish with cold. The only reason a group of athletes could give me for this procedure was that coach so-and-so told them to do it. When the function of bathing was explained to them, and the scientific reasons given for the use of the hot, cold and neutral bath, there were no difficulties in changing their bathing habits.

If training rules are to be made most effective, they must have well-established scientific reasons behind them. In addition, those who are asked to observe the training rules should believe in their virtue. Such a situation exists only when a trainer is able to back his rules with scientific facts.

Why Exercise?

By Lloyd C. Winter
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THIS article was written in the days of automobiles and the country week-ends in England but, someday, when the value of our training programs for necessary war conditioning is deemphasized, we will return to exercise for other reasons. The author, now in the naval air service, was former coach of Harold Davis at Salinas Junior College. Before entering the service Lieutenant Winter served as head track coach and assistant in football at San Jose State College.

YOU should exercise for the same reason that you service your automobile. When you exercise, you are tuning up the human machine; you are increasing the mileage of your stamina, getting rid of the carbon in your blood, replacing the worn-out parts of your tissues, improving the looks of the surface, and getting greater turn-in value on your sleep.

How we abuse this human machine, in which we drive around day and night when it is so easy to care for it! We always carry a spare tire on our automobile, but our reserve stamina, we entirely neglect. Our automobile, which may be replaced is serviced every thousand miles, whereas our body, our permanent means of conveyance, goes into the workshop only when some of its parts break down, often too late to do any good.

I have a friend who operates one of the largest conditioning quarters on the Pacific Coast. His clientele is made up almost entirely of college professors, doctors, and other professional men. He tells me that men with a reserve bank account in the five-figure class come to him with barely enough reserve energy to carry them from their homes to their swivel chairs and back. They all admit they fatigue easily, they can not sleep well, their digestions are bad, and they can not concentrate. Through a little rational exercise, in five weeks' time they are in the pink of condition. The pink of condition we shall define as that glorious state of health in which the muscles are hardened, the body full of vigor, you sleep like Rip Van Winkle, and when you awake, you feel like tearing a telephone book in two. Why does exercise do this for you? Let us lift up the hood and see.

We resemble an automobile because the parts of the body are similar to the parts of an automobile. It is true that some of us are more upholstered than others, some of us are built more on the lines of a truck, and some of us are definitely in the used-car class, but the parts that make us go are almost identical. Our muscles are miniature engines that push and pull us around at will. The efficiency and horsepower of these engines, strangely enough, depend upon their use. The more you exercise, the more the muscle tissues are broken down. If you are not entirely lacking in red blood corpuscles, they will be built up a little stronger each time, until you not only look well in a bathing suit, but you have developed a reserve stamina that you can call on any time that you need it. Here is what happens when a muscle contracts. The ignition system up in your medulla oblongata sends out a spark along one of your nerves to the muscle you are supposed to use, the fuel burns up, the muscle contracts, and whoops, you've picked up the collar button from the floor or whatever else you've finally stirred yourself to do. As in your car, carbon is left over after this process. The blood stream picks up this carbon, which is in the form of carbon-dioxide and lactic acid, and carries it up to your lungs, where it is blown out your exhaust pipe. Incidentally, this lactic acid is the cause of fatigue, and if it is not removed promptly, you will not only have a sore muscle, but you will also feel like death on a bicycle. How efficiently this lactic acid is removed, depends on your circulation, the efficiency of which in turn depends on exercise.

Exercising aids the efficiency of your circulation. As in any engine, the muscles require fuel. In the body this fuel is called glycogen, a form of carbohydrate. This glycogen is stored in your fuel tank, the liver, and must be sent up when needed. In other words, there is not enough blood in your body to digest mince pie, figure out your income tax, and hang a picture at the same time. So there is a pipe system with a set of valves that directs the blood to the place at which it is most needed. That is the reason, why it is not a good idea to exercise right after eating; that is the reason, why you should not look for that balance right after lunch, and why we get sleepy after Thanksgiving dinners. The blood is at work in digesting, and too busy to keep us mentally or physically active. The efficiency of this pipe system also depends upon its use. Efficient circulation will also make you less sensitive to heat and cold. When a

muscle contracts heat is formed. To prevent you from burning out a bearing, as the blood heats, the arterioles on the surface dilate and give your blood a chance to cool off—the same idea as the radiator in your car. When it is cold, the arterioles near the surface contract and drive the blood inward, where it has less chance to cool. So if you get red or blue in the face, it is just your radiator boiling over or freezing up, as the case may be.

If you are overweight or upholstered in the wrong places, you should exercise, because this is the only sensible way to reduce. If you want to reconstruct your front bumper, you must first exercise enough to drain all the fuel from your liver, so that your excess adipose tissue will be broken down and used for fuel. The adipose tissue or fat, acts as sort of an emergency fuel supply, and there is often too much of it. You must not refill this emergency tank by eating too much, as your calorie output must be greater than the intake. You too can have a streamlined figure, if you will but do a little exercising.

Exercising will cause an underweight person to eat more food. The greater metabolism will instill in you the hunger ravages of a starving wolf. Why do you eat more when you are outdoors on that camping or fishing trip? Principally, because you have had more than your customary exercise, and nature demands more food to replace the muscular tissue that you have broken down, and the excess fuel that you have used.

You should exercise because your heart, lungs, and kidneys owe their development to the demands of the muscular system, and therefore more exercise will give you better air-conditioning, strengthen your pump, and improve your waste disposal.

You should exercise because you will sleep better. There are few midnight sheep herders among the physically active. You will sleep better not only because your circulation is better, your heart stronger, and your digestion improved, but also because you will be tired physically, as well as mentally. I have come home from a day at the office utterly fatigued and ready for bed. I felt lower than a sunken submarine and thoroughly convinced that I was getting old. But I knew if I went to bed, I would have a mental wrestling match with myself that would surely end in a draw. Then I would get out the tow car of determination and pull myself out of this physical rut. Down to the athletic club I would go, and after an hour of badminton, or volley ball, or handball, or even boxing, that I would have believed physically impossible, I would come home with a pleasant glow of tiredness which wafted me into a sleep that only the alarm clock could penetrate on the following morning.

Your digestion will be better if you exercise, because the muscles of your viscera will be stronger, and can push a little harder on that forty-cent lunch, you have just eaten. The sedentary man can easily digest only the lightest of foods. It is probable that the nervous system is affected to a large extent by the weakening of these digestive powers. Without abundant air and exercise, sound digestion is not possible. The incompletely digested food ferments in the alimentary canal and the whole body, especially the brain, is depressed. If you are a sedentary worker, surely a little exercise is worth your time. You can be strong, healthy, and aggressive, even though you lead an indoor life. Why is physical education gaining as a compulsory subject in many states throughout the nation? One hundred years ago the school could rightly lay all its emphasis on books and learning. These, the home did not supply, but the home and the farm did supply physical exercise, vigor and perseverance. Now the schools must furnish these. In a word, they must be institutions of power as well as of learning, because a tough body and a sound nervous system are essential to our future citizens.

And now we come to what kind of exercise we should do. Almost any kind of exercise is good, from the passive exercise of massage to the strenuous exercise of boxing. Go slowly the first five hundred steps, or you will have to stop altogether. Sore muscles, stiff back, and cramped legs may be your only reward if you do not approach exercise rationally. If you have not been physically active for a long time, go to some physical trainer and let him be the guiding hand.

Do not think that exercising is a painful ordeal that must be endured. Whereas the old one-two-three-four bend at 7:30 A.M. was more work than an enjoyment and seldom lasted long even with the most determined of individuals, there are countless activities that can be a real source of happiness. I have a friend who came to me elated. "I've joined a softball team this summer," he said, "and although we have a perennial lease on the cellar position and make more errors than nine Australian bushmen playing bridge, it's more fun than anything I have ever done." His exercising is sugar-coated.

Tennis and badminton are two adult sports that are within reach of almost anyone. They are clean, active, and socially, as well as physically, advantageous. In England, tennis is part of the culture, and undoubtedly the most healthful of all British traditions. They play from six to sixty, and to be a member of a tennis club is the aspiration of every young Britisher.

Europe is not far behind the United States in realizing the value of physical activity, both as a source of health and of recreation. In England all members of the family get out in the country on week ends much the same as they do here, but in England they always take along a soccer ball, and everyone, from Uncle Marmaduke to little Mortimer, takes part in some variation of this sport. They seem to get more fun out of their picnics than the Americans who sleep under the last edition of the Sunday supplement. In the Teutonic countries, men and women get together for mixed doubles on the parallel bars or other forms of gymnastics —a bit strenuous, but surely more healthful than arguing over the bridge table. Tennis, folk dancing, skiing, riding, running, archery, and bathing are as popular on the continent as here.

Have you ever played archery golf? It is a great deal of fun, easy to learn, and will give you all the activity you need. The trick is to see how few strokes it will take you to knock a ball of worsted off tables, placed at random several hundred yards apart, around a course any size you want. A bow and arrow, a vacant lot, and a ball of worsted will suffice for equipment. Incidentally, you will not be able to resist target shooting with the arrows, and will have acquired a healthful hobby.

Recently, I have taken up two new sports, skiing and surf riding, although I am, perhaps, the world's worst skier. The first time I donned a pair of skies I was facing uphill and started to go downhill backwards. Well, you know those things haven't any brakes. I believe I would have come all the way down to the foothills, had not a tree inadvertently and abruptly halted my progress. If there is any more exhilirating sport than zooming down the slopes of a snow-laden mountain with the wind and snow beating a caprice on your face and your nerves tingling to the stimulation of that champagne-like air, then I should be pleased to know what it is.

Speaking further of winter sports, I believe that Sonja Henie's skating picture is the cause of 50,000 new amateurs taking spills on rinks all over the country, but 50,000 people are finding a new zest for living.

In surf riding you are being pushed, shoved and scraped at forty miles an hour toward shore and then dumped vociferously on a beach, well strewn with shells so as to scrape all the hide off your face and chest, but it is fun. No surf board is needed; only a wave, an insurance policy, and a great faith in your own ability are required. The idea is to catch the wave at the precise instant it is breaking, before it catches you. This battle of men against the sea gives a hundred to one odds on the sea to roll you along the bottom until you come up gasping, with a ton of sand under your bathing suit and your hair full of starfish, but it is great sport and not nearly so harmful as it sounds. You do not have to have the rolling stretches of Waikiki at your dis-

posal. Almost any coast line will do. The California coast is particularly adapted to this sport, with the best conditions at Laguna Beach.

Bowling on the green or in an alley (bowling alley) is a revived sport that started as a fad in Hollywood, and is one of the few Hollywood fads to do any one any good.

The instincts of hunting and fishing are born in all of us. About a million years ago one of your very great-grandfathers knocked a dinosaur in the head with a rock and carted him home for breakfast. This incident caused an hereditary trait to be born somewhere deep in your spinal column and needs only a little stimulation to make you an avid hunter or fisherman. Have you ever tried to entice a trout with a fly on the end of a piece of string? You have only to be bitten by that first bite, and you will forever be out after the mythical "big one" that is never caught. I caught a few whoppers about six inches long near my own back yard, and this led me on an excursion that took me to the High Sierras, and all over Canada. I had more laughs, more sleep, more rest, more eats, and more sheer zest for living than in any other three months of my life.

Last winter we decided to take our first whack at duck hunting. During the first hour before sunrise in which we tipped over our boat and stood shivering in the cold, I seriously questioned whether getting out of a warm bed for this was worth while. But you should experience the thrill that goes with witnessing the V-flight of ducks out of the first light of dawn. First your finger trembles, then you tremble all over. Shall you shoot? No, you'll wait. They're circling again now, closer. Well, we were so excited that three of us all shot the same duck, and when it hit the water, it sank. We came home tired, wet, and dirty, but with that miserable pleasantness that only a hunter knows. We are now all confirmed addicts.

Huxley once said that the struggle for happiness was truly more cruel than the struggle for existence. How do you know that knocking a little white ball around a golf green will be more fun than anything that you'll do next week, unless you try it? How do you know that volley ball, which is played in every Y.M.C.A. in the country, and requires little or no skill, will not make a host of new friends for you and keep your body at the peak efficiency, it now lacks. How do you know that any one of a hundred and fifty popular sports isn't more fun than sitting at home reading the paper, or going for that weekly drive through the park, unless you actually participate in them? Why exercise? You should exercise because you will look better, feel better, and be happier.

Players, Red Flags, Officials Versus Rules

By "Lil" Dimmitt
Athletic Trainer, Texas A. and M. College

FOOTBALL has its casualties, possibly less pronounced than war, but war operates under better rules and supervision. All of us, from players to coaches to spectators, want to protect the participants from injuries as much as possible, and it is with this thought in mind that I address these remarks through the pages of *The Athletic Journal* to the rule makers and the officials.

Based on an observation of many years as player, high school coach, and during the last ten years as trainer and assistant coach at the Agricultural and Mechanical College of Texas, I do not feel that the penalties for kneeing and other violations, coming under the heading of unnecessary roughness, are severe enough, nor do I feel officials are as diligent as they should be in calling the violation and punishing the team of the offender.

We'll call him "Trusting Joe," but he might have been any tower of line strength or of backfield elusiveness and power. It may be he was a scat-back or the big boy who could always be depended upon to pick up the needed two yards right through the middle. The armed services called him and he reported, wondering if he were bound for Europe, or one of those Pacific islands on the road to Tokio. He was sound physically—there could be no doubt about it—for hadn't he demonstrated his physical fitness on dozens of gridirons, and hadn't the public acclaimed his deeds in thunderous ovations?

Then came the rude awakening. The medico classed him 4-F and suggested a job in essential industry. Sitting right beside him, as he dressed, was the flute player in the band whom the army or the navy was giving three weeks to report for active duty.

Our Joe was rejected because of a bursted ear drum. Dejectedly he finished dressing, for all he wanted was to get out of there. Perhaps, he recalled that autumn day when the opposing player gave him the knee, not once but several times. His coach had protested and the spectators in the stands protested but the officials "didn't see it," or answered, "He didn't mean to do it," when the officials admitted kneeing had been done. No, they hadn't called a penalty when Joe got the knee but the air was full of red flags when Joe himself, carried away by the excitement of the game, got a little offside.

Far-fetched, you may say, but it is not a bit. It has happened many times, and it will happen again and again, if we do not do something about it.

In my ten years with the Texas Aggies, I have seen fully fifty wide-open kneeings, and I can count on the fingers of one hand the number of times penalties have been assessed for this offence. There was one boy who was kneed several times in one game and his school had to pay his expenses to a famous Northern hospital for treatment of head injuries. Three of our own boys have had noses broken by being slugged in the past three years, but no slugging penalties were called.

Football players are like apples, there is a "rotten one in every barrel." It is against such boys that I feel the other players are due more protection, for I am convinced that a great many, if not a majority, of the cases of kneeing are intentional. Any boy who would knee would lie about it.

Many times we, and other coaching staffs, have protested about kneeing, slugging, or jumping on. There is a stock answer on the part of the official, "I didn't see it," or "He didn't mean to do it." A penalty, if ever assessed, is fifteen yards for unnecessary roughness, or such other distance as the referee deems will fit the case, including ejection of the offender from the game. Are these violations called often enough? Firmly and flatly—they are not.

I believe the rule books should show in bold, black type an unmistakable penalty of half the distance to the goal line for each kneeing violation, whether done intentionally or unintentionally. I believe a crusade should be gotten under way by football officials to let every player know that the rule is there, and that it is going to be enforced in full spirit and letter. Then, we will have fewer injuries.