The Fontainebleau Interservice Sports School

General Fourquet, Chief of Staff of the French Army honored the CISM symposium with his presence. He is shown here with Colonel Le Borgne and Colonel Grandjean.
In guise of summary

In this year commemorating its twentieth anniversary, CISM's official news medium « Sport International » will attempt to assess the status of our activities. The first 1968 issue constituted an up-to-date presentation of our organization. It is a reference document which aptly answers the often asked question: What is CISM? This second issue is devoted to an important topic: « The military methods of Physical Fitness and Sports Training ».

The latter were presented and disseminated by representatives of 28 member countries at the recent symposium sponsored by the French Delegation at the Fontainebleau Interservice Sports School. It is obviously impossible to include in this magazine a full transcription of the multiple lectures and reports. A selection therefore had to be made.

Hence, the table of contents lists:

— The presentation and orientation of the symposium by Colonel G. Le Borgne, chief of the French Interservice Physical Fitness and Sports Section and Member of the CISM Executive Committee.

— The description of the Interservice Sports School which was a magnificent setting for the Symposium.

It is the landlord, at it were, of this impressive estate, Colonel P. Grandjean, who, in his capacity as Commander, acquaints us with the multiple facets of the School, a great French achievement to be set as an example and inspiration to all Armed Forces.

We have selected Lt. Col. R. Gueguen’s « New French Orientation » as most descriptive of the current trends. Col. Gueguen, former CISM Military Pentathlon champion, is Chief Instructor at the Interservice Sports School.

Among the presentation relating to various organizations, our choice unhesitatingly went to « Physical Fitness Training in the Italian Armed Forces ».

This document struck us as being of great interest, in that it outlines an all-encompassing system based on the deep-rooted and harmonious integration of sports activities at all levels, i.e. Armed Forces, National Olympic Committee, Sports Federations, and Youth Circles.

Let us now broach the subject of training procedures.

Major Kenneth Cooper (MC) of the United States Air Force contributed a « best seller » in which he describes the facilities, tests, and training methods leading to « the development of a physical conditioning program ».

While Commandant M. Vrillac (MC), France, member of the CISM Academy, proposes an article entitled « Musculation and Physical Training in the Armed Forces », Colonel G. Le Borgne offers a worthwhile closing item which features the first conclusions of this excellent symposium.

Dear Readers,

We wish, as of now, to draw your attention to the next issue of « Sport International ». It is our intention to make it a logical follow-up on the current edition. You will find therein reports on the Nordic Systems, the highly scientific German doctrine, and the concepts adopted by several nations in full sports evolution, Iraq, Tunisia, Ivory Coast, etc.

The publication will include three important articles:

— the Sports Units;
— Dietetics;
— Control Tests.

The year marking our organization's Twentieth Anniversary will end with a special Magazine issue — the 1968 Military Sports Parade — which will include the results of all our championships, action pictures of such events and, in short, a vivid reflection of the rich and busy life of our CISM.

R. MOLLET,
Permanent Secretary General.
Address by Colonel G. LE BORGNE,
Chief of the Interservice Sports Section,
Member of the CISM Executive Committee

Admiral, Mr. Secretary General. My good friends,

France welcomes your visit to Fontainebleau on the occasion of the CISM Symposium which, as you know, is convening with a view to studying the various physical training methods within our respective Armed Forces.

The goal of this symposium is to analyze, and I repeat, analyze, the various physical training procedures in different Armies. It is therefore to be considered as an informative reunion with no intent to advance concepts toward the creation of an "ideal training method." We do not claim — either within CISM, or much less in France — to have mastered this problem. On the other hand, it might be interesting to learn what is done outside one's borders, and retain such information as can be adapted to the training requirements and means at home.

I deliberately dwell on the spirit which is to prevail over this endeavour — one of purely analytical nature. No conclusions will be voiced upon completion of the conference. They will be left for you to draw from the documentation which you will bring back with you.

The presentations will deal with the methods in use, tests, and control procedures, for I believe this is of interest to all of us, just as we are unanimously curious to know the trends in our respective training concepts. In addition to these presentations, which will shortly be identified by Colonel P. Gueguen, I have requested several speakers to comment on other sports topics, which might be termed general, were it not for the fact that they have now become an indispensable part of modern training. Raoul Mollet, who, as you know, is one of the staunchest promoters of fractional training has kindly accepted to give us an hour's briefing on this method. Commandant M. Vrillec (MC) will tell us of Musculation. I have asked him to study this aspect of training on the basis of methods reserved for outstanding athletes and attempt to isolate such data as may be applicable to the layman, or, in other words, the majority of recruits. It was. I must admit, a delicate task, which he treated as such: we will rely on the Jury's leniency. Commandant Leger (MC), dietician and pupil of Doctor Creffi, will make an exposé on dietetics and the importance of nutrition in the context of training effectiveness.

We believe, in CISM, that all of us — all of you — who are sports leaders must not only orient others toward sports, but also practice what we preach. It is, in my opinion, an important factor of equilibrium. The Sports School will place both its facilities and equipment at our disposal, so that we can relax for one hour each day.

General Fourquet, Chief of Staff of the French Army will personally greet you tomorrow morning and preside at a luncheon.

And once more: Welcome!
Endowed with a wealth of traditions — the legacy of such institutions as the Antibes School, the Joinville Battalion, and the Naval Sports Center, the Interservice Sports School must be more than a mere merging point for its components. It aspires to be an entity, « A School » with its own traditions reaped from day to day experience.

The Interservice Sports School was inaugurated on 1 September 1967 on the premises of Fontainebleau’s Camp Guynemer, a facility heretofore occupied by the Headquarters for Central Europe.

The following agencies were deactivated upon creation of the New school and integrated into a single institution bearing the name of « Interservice Sports School »:

— The Interservice Sports Section of Joinville (G.S.I.A.) reinforced by the shooting Modern Pentathlon, and Parachuting elements whose parent units had been the Montauban C.I.S.T.C.N., the Bordeaux 4th Military Region, and the Pau School for Airborne personnel, respectively;

— The School for Military Fitness Training at Antibes which heretofore graduated the Ground and Air Force coaching personnel;

— The Naval Physical Fitness Center in Toulon, which ensured training of coaches for Navy Personnel.

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This fundamental mission is threefold:

— **Training of Specialized Personnel:**

— Sports officers;

— NCO's having voluntarily enlisted in the Ground Forces in the capacity of assistant-coach, coach, or head coach;

— Trainers, project officers, and instructors;

— Referees;

— As well as initiation and information for the benefit of the cadre.

— **Competitive Events.** In coordination with the Ministry of Youth and Sports and the various Federations:

— Individual and group training of selected athletes;

— Establishment of French Military teams;

— Scheduling and implementation of international military events (such as, in 1968: April — International Modern Pentathlon championship; May — CISM Technical Symposium, then week-long visit by 50 Soviet Union Military athletes in the framework of Franco-Soviet Exchanges; July — International Championship for Reserve officers; and in September — CISM Shooting Championship).

The primary **MISSION** of the Interservice Sports School is to instruct, train, and inform the Cadre, specialized personnel and athletes in the Armed Forces and State Police Forces.
— Research and Development effort carried out at the request of the E. M. A. and the Services:

— Formulation of training methods and procedures for general application or adapted to the requirements of each branch of service;
— Study, preparation, and dissemination of technical notices and regulations;
— Sports for all — Tests — Control;
— Medical aspects of sports.

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An Interservice agency placed under the command of the Army chief of staff in charge of Sports, the Fontainebleau School is attached to the Interservice Sports and Physical Fitness Section. The latter assumes responsibility for meeting the School’s operational requirements, providing proper control, establishing both its objectives and overall programs, and ensuring liaison with the Ministry of Youth and Sports.

The threefold mission of the School, as defined above, is reflected in its organizational structure. Its constituent elements (exception made for those inherent in any functional outfit) are listed below:

— The Instruction Battalion subdivided into 3 companies, is tasked to:

— provide basic military training for specialized ground forces enlistees as well as for recruits assigned to the Joinville Battalion;
— ensure training of officer and NCO specialists for all three branches of Service; State Police Personnel, and Masters of Arms, whose training spans over a period of 2 years.

The facilities can accommodate 400 to 500 trainees concurrently (to include a few foreign participants).

— The Joinville Battalion is comprised of two Brigades and tasked with the individual and collective training of 350 athletes of national and international level, specializing in 22 different sports. Among the personnel involved, the ratio of career servicemen is steadily rising, as compared to that of recruits proposed by their respective Federations.

— Instruction Leadership is assumed by the «Research and Development» Section in conjunction with other Instruction Missions. It includes four Offices:

— 1 office of Research;
— 1 office of Means and Programs;
— 1 office of Course Coordination;
— 1 office of the Counseling Officer-General Instruction. English language courses have been organized for the benefit of the Joinville Battalion athletes.

The activities of the Instruction Leadership Branch have so far been centered on the revision of the NCO Coach Programs, with the dual purpose of:

— standardizing the programs in the three branches of service;
— reviewing these programs in light of the new concept of «Sports Motivation».

The Leadership body operates in close cooperation with the School’s Health Department whose basic mission is complemented by all the sports facets of medical care:

— Sports-medical control of athletes and trainees;
— Preventive and curative sports-medical care;
— Dietetics — Statistics — Various research;
— Educational goals: Anatomy — Physiology.

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In essence, the facilities in existence at the time they were taken over by the school have adequately filled the needs, except for the dispensary, day-room, and kitchens, which were completely renovated.

The problem of sports facilities was a far more challenging one. The only existing facilities were an indoor swimming pool (25 m x 12 m) and a gymnasium. All other installations were the result of major transformation of some areas or outright additions.

The work undertaken in this context is nearing completion; several months hence, the school will feature the following facilities:

- At the Guynemer Camp:
  - 1 Honor stadium, with a 400 m, 6 lane track;
  - 1 Training stadium, with a 250 m track;
  - 3 Rugby and soccer training fields, with 1 soccer wall.
  - 1 indoor area for javelin, shot put, hammer, and discus throwing;
  - 1 international 3-lane combat course;
  - 8 basketball, volleyball, and handball courts;
  - 3 tennis courts;
  - 1 swimming pool;
  - 2 indoor gymnasiums;
  - 3 gymnastics halls;
  - 2 musculation halls, and 1 sauna;
  - 1 weightlifting hall;
  - 3 judo halls;
  - 2 boxing halls;
  - 2 wrestling halls;
  - 3 fencing halls;
  - 1 olympic shooting range (50 m and 25 m for rifles and revolvers);
  - 1 « Ball Plast » shooting range;
  - 1 National combat course;
  - 1 Rink course.

- In the immediate vicinity of the camp:
  - 1 indoor gymnasium;
  - 1 indoor track and field stadium, with a 333 m track (accommodated within a 180 m x 30 m hangar);
  - 1 300 m olympic shooting range optionally convertible into a 200 m range;
  - 6 soccer and rugby fields;
  - 1 naval facility on the banks of the Seine for rowing, canoeing or kayak sailing and motorboating activities.

In addition to the impressive array of facilities permanently available to it, the school may also use the stadia and fields of neighboring clubs and municipalities. Paratroopers, for instance, are allowed to train at Ferté-Gaucher and at Moret-Epiry.

While the responsibility for instruction of the Joinville Battalion athletes is now vested in the School Commander, the ties with the National Sports Institute remain nonetheless very strong, with athletes specializing in given sports periodically training at INS facilities.
Towards a new sports method

As noted above, since 1909 Military Physical Education was based on the "natural method" devised by George Hebert. In 1946, a short-lived effort was initiated with a view to enhancing it with a "corrective and maintenance" method.

The results, however, fell short of expectations. We must face the fact that our Military Physical Education, which stresses General Conditioning and Combat Training while overlooking Sports, was accepted without enthusiasm and fostered neither motivation nor interest on the part of the personnel.

This stems from the fact that methods lacking the sports aspect are restrictive and incomplete in the sense that they cater to the body alone. Sports, however, promote both physical and mental development.

It develops a taste for loyal struggle. Its action therefore is not confined to strengthening the muscles, heart, and lungs, but actually constitutes an essential part of Education.

It is a source of enthusiasm and zest for life. It also serves to cement the links between the cadre and the young soldiers, thus consolidating the human relationship, which when no longer fostered by the dangers of war, tends to slacken in peacetime.

It must be understood that "Sports Method" is not to be interpreted as merely running with or after a ball, attacking sword in hand, or exercising on a judo mat. Sports Training involves conditioning in terms of natural methods, circuit training, muscular development, study of tactics, psychological preparedness, etc.

And so, the concepts elaborated by Pierre de Coubertin at the end of the last century, brought back into focus by Maurice Baquet in his 1947 publication "Sports Education", and more recently aptly codified in Major Mollet's "Total Training", will at last receive the consecration they deserve.

A sports doctrine geared to military personnel must clearly demonstrate that sports are a requisite for sound combat training. The goals, role and place of sports training must therefore be specified and well understood by the Cadre.

The practice of sports within the Armed Forces is designed to provide all personnel with the degree of fitness ensuring optimum benefit from professional training, its maintenance, and eventual improvement. It represents a prerequisite on which much remains to be built, but without which results will fall short of the target. What we used to call "combat training" must not be considered as a substitute for sports education. The latter is a distinct component of professional military training based on sports and sports alone.

In other words such drills as the combat course, risk course, hand-to-hand combat, etc., while remaining a must in military training do not fall under the heading of sports education and should be carried out separately without infringing on the time reserved for the Sports Program.

Modern sports training is no longer a mere body builder; it is a multi-faceted and rational program, in which the technical, psychological, and medical elements are given precedence in function of the various
categories of personnel, their occupation, characteristics, and age bracket. Dietetics are taken into consideration and all factors must be closely controlled, which requires a working relationship between the physician, the coach, and the leader.

Having thus become the basic element of the personnel's physical conditioning, sports training has its rightful place in the overall educational program. As an integral part thereof, its scope and requirements in terms of time must be carefully and judiciously calculated. Half an hour daily and half a day each week constitute a wholly adequate schedule, but one, however, which must be faithfully adhered to.

Sports are unquestionably a Service activity inasmuch as they are a requisite to its proper functioning.

In order to obtain the results one is entitled to expect therefrom, sports training must be conducted rationally and in a favorable environment. It must reach all the personnel.

This implies:

- Training as Sports Instructors of the officer and NCO cadre which will graduate from all our military schools, as well as refresher courses for the older personnel. It stands to reason that if our officers are not sports-minded, whatever we may do — from the creation of a sports infrastructure to the training of experts — will bring but ungratifying results. On the other hand, let but one sports-minded colonel take over a neglected regiment and changes suddenly occur while he finds adepts solutions to so-called insurmountable problems, to include that of infrastructure. It is therefore necessary to inject all our officers and NCOs with the sports virus at the time of their training in school so that they remain «contagious» throughout their career.

- The training of specialists, and military instructors in the field of Physical Education and Sports. This is, among others, the mission of the Fontainebleau InterService Sports School which was inaugurated on 1 September 1967. Benefiting from a well-rounded infrastructure, this school measures up to the requirements of a modern military system. It will ensure doctrinal and instructional cohesion and provide the means to train a large number of qualified sports specialists.

- Scheduling numerous competitive events within the basic units and keeping in mind that the new doctrine rests on the concept of «sports motivation».

Each subject must choose two sports, respectively requiring individual and collective performance. His input is initially that of mere participation in anonymous teams; experience has shown that he quickly becomes interested, particularly if at all gifted. With a view to improving his performance, he is then subjected to training sessions and reaps all the benefits of total training. Thus the system applied to proven athletes is placed within the reach of the layman.

The fact that such procedures feature no immediate military application is unimportant, the primary goal being to promote physical and mental fitness of the personnel.

A closer relationship with civilian sports, a much needed factor were it only for the sake of the national effort for the benefit of youth, shows evidence of progress. The possibility of interchangeably using each other’s infrastructure and facilities, to equate civilian and military diplomas, etc., will soon become a reality and some directives have already been issued to this effect.

Lastly, the already important military participation in civilian events will become more prevalent yet.

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No sooner outlined within the Armed Forces, the new sports method is already rich in supporters and followers. Interest is evidenced at all levels of the three services.

Later on, new methods and doctrines will undoubtedly emerge, better suited to their times and we welcome the prospect for, to quote P. de Coubertin himself:

«Neither the law nor customs must become intangible, the premise being that man was not created for them, but rather they for him.»

Lt. Col. GUEGUEN
Director of Instruction
at the Fontainebleau InterService Sports School
Physical Conditioning of the Italian Armed Forces Personnel

by colonel R. CAROLI

Concept

The physical fitness program conceived by the Italian Staff for career and drafted personnel is based on the following facts and ideas:

1. The short duration of military service — in the context of increasingly complex training requirements — and the availability of new military means demand a most discriminating selection of military geared psycho-physical objectives.

2. Such objectives must be defined in light of operational requirements stemming from day or night combat situations.

The soldier’s psycho-physical training must be conceived so as to cover potential action within a tactical zone radius of 300 to 400 m in the daytime versus 200 m or less at night.

Another factor to be considered is the eventuality of isolation, in which case the soldier may be faced one or all of the following challenges: quickly cover a long distance, clear natural and man-made obstacles without undue prejudice to his mental alertness and muscular resiliency, and react with or without weapons, to sudden or unforeseen threats.

3. A line must therefore be drawn between the military aspect of physical training and the conventional approach to physical fitness and sport, which nevertheless will serve to enhance the military objective. In short, while physical fitness may be achieved through exercising and sport, military training must remain flexible enough to follow the changes in operational concepts.

4. The unpredictable situations arising from wartime activities necessitate that the chiefs of staff follow and encourage all scientific research in the realm of sports. This interest is justified by the fact that implementation of any new concept in that area will serve to raise the mean physical effectiveness level of all military personnel. It follows that, to this end, the first step is for the military authorities to learn the training and behavior of high caliber athletes with a view to devising a modified program for the benefit of the layman.

5. Moreover, notwithstanding the scientific implications involved, it is the staff’s duty to assist in the formation of champions in such predominantly military disciplines as Modern Pentathlon, shooting and long distance skiing.

6. A military physical fitness program must be both educational and recreational; hence the necessity for conceiving it on the basis of sports competition.

7. The characteristics of modern warfare emphasize the need for all military personnel, regardless of rank, to maintain an adequate degree of physical fitness. However, the military leader, for one, is almost inevitably subjected to periods of sedentary life. This brings up an important question: how to preserve physical fitness of personnel over 30?

8. The multifaceted problems involved in the establishment of plans and programs, coupled with the need for program supervision and control, require the services of a much greater number of specialized personnel than in times past:

- physical fitness instructors;
- specialists in military fitness training;
- sports officers (leadership and programming);
- physiologists and medical specialists.

9. For the sake of productivity and effectiveness (relationship with trainees), all cadre officers and NCO’s should receive a basic training in the field of physical fitness instruction.

10. Military physical and sports activities fall into distinct categories, namely:

- military physical instruction of the masses;
- recreational sports, as mass activity;
- sports at the championship level;
- training of leaders and instructors;
- scientific research.

Goals and objectives of the various ramifications

- **Military fitness instruction**
  In this area the psycho-physical objective is to promote combat readiness in a battlefield environment without significant detriment to mental alertness and physical capabilities.
  Training to this end is conceived to condition the soldier to the following requirements:
  - march 10 km at a rate of 7 to 8 km per hour;
  - run over variable terrain covering a distance of 2 to 3 km;
  - clear natural obstacles such as walls, ditches, hedges, and rocks; scattered over a distance of 500 to 600 m;
  - remain motionless, lying on the ground, for at least one hour, without impairment to either mental or physical reflexes;
  - react instinctively and with accuracy, day or night, whatever the weapon or hand;
  - whether by night or day, unarmed, attack and neutralize the adversary while simultaneously repulsing any armed or unarmed assault;
  - cover short distances over variable terrain at top speed (to be repeated several times);
  - haul heavy objects and full equipment over a distance of 200 to 300 m (to be performed individually and in groups);

- display adequate precision in throwing grenades and other explosives;
- clear waterways, ditches, and other obstructions.

- **Recreational Sports**
  They represent an indirect asset to the military objective. The following activities are particularly recommended:
  - combat sports;
  - shooting (sports weapons);
  - team games.

- **Sports at the championship level**
  Objectives: Contribute to the national effort, stimulate and cooperate.

- **Training of leaders and sports specialists**
  It is of utmost importance that the Armed Forces be provided with specialized personnel to carry out the following missions:
  - maintain the physical fitness program on a par with that of more advanced nations;
  - contribute to the expansion of leisure sports among the population;
  - select and train high caliber athletes;
  - establish programs and control physical activities on a scientific rather than empiric basis.

- **Scientific Research**
  Provide the leaders, sports specialists, and scientific agencies with statistical and factual data gleaned in military circles.
  And more specifically:
  - define the partial goals of each category of military fitness activities;
  - establish psycho-physical performance criteria to be met by individuals or groups;
Implementation

Military Physical Fitness Program
The Italian Armed Forces Physical Fitness program includes:
1. Increase of physical effectiveness by means of generalized activities during the initial phase of military service;
2. Military Pentathlon - Ground Forces;
3. Naval Pentathlon - Navy;
4. Pentathlon - Air Forces;
5. Track-field: racing, jumping, shot put, walking;
6. Self defense;
7. Instinctive shooting;
8. Exercises of application synthesis;
9. Orientation as adapted to the services requirements.

Recreational sports program
It features participation by all in Italy's most popular collective games, i.e.:
- Soccer;
- Basketball;
- Volleyball;
- Waterpolo;
It furthermore provides for officers and NCOs to practice:
- Fencing (highly recommended);
- Judo;
- Boxing;
- Rifle and Pistol Shooting.

High level Competition
- The program is that established by national sports federations;
- Military personnel participation takes places under the auspices of:
  - The interservice sports centers;
  - the Ground Forces Center;
  - or the clubs they originally belonged to, in the case of:
    - Soccer events;
    - Cycling events;
    - Waterpolo events;
    - Basketball events;
    - in the sports center, the technical aspect of training is generally entrusted to military coaches;
- in the special sports units, to which are assigned recruits representing the «national elite» and who compete under the sponsorship of their own club, coaching is the responsibility of federal instructors.

This applies to the following sports:
- Soccer;
- Cycling;
- Basketball.

Training of sports leaders and masters.
Such training is ensured by the Central Sports School of the Italian National Olympic Committee (CONI) which gives the students a legal certificate upon completion of a three-year course. High ranking officers are appointed by the General Staff.

Cadre of Military Coaches
1. This type personnel is trained at the Orvieto Military School of Physical Education. The curriculum is similar to that established for Sports Masters.
Graduates are qualified to:
- elaborate activities at the Battalion level;
- organize and supervise competitive events;
- coach the Shooting and Pentathlon teams of large units;
- program and organize recreational sports activities at the garrison and unit levels;
- ensure maintenance and improvement of sports equipment and facilities;
- participate in surveys of sports installations and draft projects for improvement;
- control training proceedings;
- assume responsibility for training of the cadre (over 30 years of age);
- maintain contact with local CONI agencies and garrison schools;
- enhance sports and social relationships between the military agencies and local civilian circles;
- organize sports activities for student, youths, and career personnel dependents.
2. The Orvieto School schedules 2 to 6 months training courses, for qualified coaches in Pentathlon, Judo, Self-Defense, Shooting, Fencing, Boxing and military Swimming.
3. The same school features 2-month courses for physical fitness instructors.
4. The civilian federations centers graduate coaches in the various sports after training courses of 1 to 12 months.

Scientific research
- Programs of a military nature are established at headquarters level by working parties specializing in the medical aspects of sports;
- Programs of a sports nature are established at Headquarters level in cooperation with representatives of the relevant federations.

SPORTING ORGANIZATION OF ITALIAN ARMED FORCES

1. Chief of Staff.
2. Armed Forces Headquarters (Army, Navy, Aeronautics) General Commands of Special Forces.
3. Military Regions, Army, Corps, Territorial Jurisdictions of Special Forces.
4. Divisions, Brigades.
5. Regiments, Corps, Schools.
6. Battalions, and similar units.
7. Companies, and similar units.

(1) Draftees participating in federal sports activities under the auspices of their civilian clubs (soccer, cycling, swimming, basketball, hockey, weightlifting).
(2) Military personnel, whether or not on active duty, participating in federal sports activities as members of Military Center Teams (rugby, track & field, volleyball, tennis, rowing, judo, horseback riding, fencing, modern pentathlon, shooting, skating, belaying, boxing, wrestling).
Performance of Circuit Training as adapted to the requirements of hand-to-hand combat.

1 Warm-up: 2-3-4 falls; 5 arms and pectoral muscles; 6 entries; 7-8 static and dynamic-static isometrics.

"Circuit Training" performance as adapted to the requirements of Military Pentathlon.

1 Palms and ankles; 2 dorsal muscles; 3 abdominal muscles; 4 lumbar muscles; 5-6 arms; 7 abdominal muscles; 8-9 arms; 10 legs; 11 dorsal muscles action in swimming.

Circuit Training performance as adapted to the requirements of compulsory sports, such as soccer, basketball, and volleyball.

1 arms and dorsal muscles; 2 abdominal muscles; 3) legs and abdominals; 4 arms and abdominals; 5 arms and dorsals; 6 legs and abdominals; 7 mobility of the joints; 8 arms and dorsals; 9 mobility of the joints; 11 dorsal and lumbar muscles; 12 dorsals and abdominals; 13 arms; 14 arms, dorsals and lumbar; 15-16 mobility of the joints.

Performance of Circuit Training in open air. This series is geared to the requirements of compulsory sports.

1 legs and dorsals; 2 arms, dorsals, lumbars; 3 arms and dorsals; 4 abdominals and dorsals; 5 mobility of the joints; 6 arms, dorsals; 7 abdominals, dorsals and legs; 8 mobility of the joints; 9 thighs, legs, foot.
Physical Fitness

The development of a physical conditioning program

by Major K. H. COOPER, USAF, M. C.

The author, Major Kenneth H. Cooper, USAF, MC, is director of the Airspace Medical Laboratory, Wilford Hall, USAF Hospital, Laskland AFB. His current endeavor in the field of research includes a study of the role played by physical fitness in the performance of Air Force crews in operational and outer space flights.

Physical fitness may be defined in many ways because physical exercise can be used for relaxation, increasing the strength and size of muscles, or improving the condition of the cardiopulmonary system. To some people, physical fitness merely implies "feeling good," or, perhaps, freedom from disease. To others, it is synonymous with muscular strength. However, the more professionally accepted definition implies adequate cardiopulmonary reserves. This latter type of fitness is of major importance to personnel in the United States Air Force, since cardiovascular-pulmonary problems frequently result in the grounding of flying personnel, separation from the service, or premature retirement. Therefore, in developing a new physical conditioning program, the primary objective was to improve the function of the cardiovascular-pulmonary system. Many types of physical conditioning programs will allegedly improve the cardiovascular-pulmonary system, including the strict muscle conditioning programs. However, Rosmann questioned the effectiveness of this type of conditioning when he demonstrated that in comparison with the untrained
normal persons of the same age, well-trained weightlifters and gymnasts had no advantage in their cardiovascular reserve. From his studies, he concluded that weight-lifting and gymnastic training should not be used in the prevention of rehabilitation of cardiovascular diseases since this type of training has no significant beneficial influence on the cardiovascular system.

In contrast, endurance conditioning programs readily produce significant changes in both the cardiovascular and pulmonary systems. When Roskamm (1) expanded his study to include boxers, cyclists, wrestlers, pentathletes, and skiers, he noted that all showed a significant improvement in their cardiovascular system when compared with untrained normal controls. Similar results on endurance trained athletes have been reported from exercise physiology laboratories throughout the world, including studies performed at the Aerospace Medical Laboratory (Clinical) at Wilford Hall USAF Hospital.

Endurance training of the type necessary to develop competitive athletes is not the objective of a standard physical conditioning program. However, from a medical viewpoint, it is highly desirable to have adequate cardiovascular reserves. Adequate reserves make it possible to tolerate unexpected emergencies requiring unusual physical stamina without danger to the cardiovascular system (2).

To obtain adequate cardiopulmonary reserves, an exercise program that includes some type of regular, vigorous effort is required. Unless the training stresses the cardiopulmonary system and is of sufficient duration, minimal benefits will be observed. Karvonen (3) found that in training experiments on the treadmill, a run of half an hour daily four to five times a week for four weeks did not improve circulatory performances if the heart rate during the run was 135 per minute or lower. However, if the heart rate exceeded 150 per minute during the run, a significant increase in performance was seen. Hollmén and Venhäm (4) obtained similar results in subjects exercising daily on a bicycle ergometer. Other investigators have shown that 8 to 10 minutes of daily sustained exercise performed for several weeks will produce a significant change in cardiopulmonary function. Intermittent exercises, such as basketball, handball and squash, have required considerably longer periods to achieve the same training effect.

As these prerequisites for optimum cardiovascular conditioning became apparent, it was evident that before a training program should be developed, a reliable method of comparing various types and patterns of exercise had to be identified. In searching for a method to equate different exercises, the oxygen cost proved to be the ideal a common denominator. It could be obtained readily by collecting the expired air during a standard performance, i.e., walking, running or cycling a known distance in a specified time. It has been necessary to study a cross-section of highly-conditioned athletes and deconditioned subjects because oxygen cost changes with conditioning. In this manner, the average energy expenditure was determined, and a simple point system was established. The points represent, in multiples of 7, the average oxygen cost in ml/km/min. A sample of the point values assigned to walking and running is given in Table 1.

Table 1: Oxygen cost for walking and running

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<th>Mile time (minutes)</th>
<th>Average oxygen cost (ml/kg/min.)</th>
<th>Point value</th>
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<tbody>
<tr>
<td>Over 20</td>
<td>Less than 7</td>
<td>0</td>
</tr>
<tr>
<td>14'30 - 19'59</td>
<td>14 - 7</td>
<td>1</td>
</tr>
<tr>
<td>12'00 - 14'29</td>
<td>25 - 14</td>
<td>2</td>
</tr>
<tr>
<td>10'00 - 11'59</td>
<td>31 - 25</td>
<td>3</td>
</tr>
<tr>
<td>8'00 - 9'59</td>
<td>35 - 31</td>
<td>4</td>
</tr>
<tr>
<td>6'30 - 7'39</td>
<td>42 - 35</td>
<td>5</td>
</tr>
<tr>
<td>Under 6'30</td>
<td>&gt; 42</td>
<td>6</td>
</tr>
</tbody>
</table>

Now that a method was available to equate various exercises, a fitness goal had to be established. Studies were initiated to evaluate well-conditioned men, and in other studies deconditioned subjects were placed in a variety of progressive exercise programs. Adequate cardiopulmonary fitness was believed to be achieved when a subject's maximal oxygen consumption reached a minimum of 42 ml/kg/min (5-6). From the results of these studies, it was apparent that exercises totaling 30 points per week would produce the desired level of cardiopulmonary fitness if achieved progressively over a 10-16 week period. An example of such a program is presented in Table 2.

Table 2: A sample 30 point exercise program

<table>
<thead>
<tr>
<th>Day</th>
<th>Exercise</th>
<th>Distance</th>
<th>Duration</th>
<th>Points</th>
<th>Cumulative points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Run</td>
<td>1.5 miles</td>
<td>11 - 30 min.</td>
<td>7 1/2</td>
<td>7 1/2</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Basketball</td>
<td>—</td>
<td>35 - 00 min.</td>
<td>5</td>
<td>12 1/2</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Swimming</td>
<td>600 yards</td>
<td>16 - 00 min.</td>
<td>5</td>
<td>17 1/2</td>
</tr>
<tr>
<td>Thursday</td>
<td>Cycle</td>
<td>5.0 miles</td>
<td>16 - 00 min.</td>
<td>5</td>
<td>22 1/2</td>
</tr>
<tr>
<td>Friday</td>
<td>Walk</td>
<td>2.5 miles</td>
<td>35 - 00 min.</td>
<td>5</td>
<td>27 1/2</td>
</tr>
<tr>
<td>Saturday</td>
<td>Golf</td>
<td>18 holes</td>
<td>18 holes</td>
<td>3</td>
<td>30 1/2</td>
</tr>
</tbody>
</table>

Table 3: The 12 minute walk/run fitness test

<table>
<thead>
<tr>
<th>12 minute performance (Miles)</th>
<th>Maximal oxygen consumption (ml/kg/min.)</th>
<th>Fitness category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1.0</td>
<td>Less than 25.0</td>
<td>Very poor</td>
</tr>
<tr>
<td>1.0 - 1.24</td>
<td>25.1 - 33.0</td>
<td>Poor</td>
</tr>
<tr>
<td>1.25 - 1.49</td>
<td>33.1 - 42.0</td>
<td>Fair</td>
</tr>
<tr>
<td>1.50 - 1.74</td>
<td>42.1 - 51.0</td>
<td>Good</td>
</tr>
<tr>
<td>1.75 or more</td>
<td>Over 51.0</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

The final step was to develop a test of cardiovascular fitness that could be administered easily in the field yet would correlate well with the more accurate and sophisticated laboratory techniques for measuring maximal oxygen consumption. By using the model established by Blake, it was shown that a runwak test of 12 minutes requiring near maximal performance correlated well with laboratory tests. A correlation coefficient of 0.9 was determined between treadmill-measured maximal oxygen consumptions and the 12 minute field test of fitness (7). This high correlation made it possible to estimate accurately the maximal oxygen consumption by field testing and to classify large groups into various physical fitness categories rapidly. The 12-minute walk-run category classification is presented in Table 3, and the test results for a large group of Air Force personnel are presented in Table 4.

Table 4: Performance of 1,706 Air Force officers and airmen, age 17-40 years

<table>
<thead>
<tr>
<th>12-minute performance (miles)</th>
<th>Percentage</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1.0</td>
<td>10.0</td>
<td>Very poor</td>
</tr>
<tr>
<td>1.0 - 1.24</td>
<td>20.2</td>
<td>Poor</td>
</tr>
<tr>
<td>1.25 - 1.49</td>
<td>40.8</td>
<td>Fair</td>
</tr>
<tr>
<td>1.50 - 1.74</td>
<td>18.1</td>
<td>Good</td>
</tr>
<tr>
<td>1.75 or more</td>
<td>1.9</td>
<td>Excellent</td>
</tr>
</tbody>
</table>
Summary

A program that will improve cardiopulmonary reserves was developed. It is scientifically sound and its effects have been extensively documented. If properly accepted and practiced, multiple benefits can be expected, including a healthier and more productive work force.

MUSCULAR DEVELOPMENT AND PHYSICAL TRAINING IN THE ARMED FORCES

A large part of the athlete's training program is devoted to muscular development. In the light of the available — if incomplete — data on this subject, it seemed worthwhile to define the basic characteristics of this form of training and use them as a guideline in the establishment of a training program hinging on muscular development and tailored to the majority of recruits.

On the basis of the information at hand, we propose to elaborate on the following points:

- effects and results to be expected from muscular development;
- recommended methods in a military environment.

The term « musculation » is currently defined as a systematic development by a given demand placed on the muscles. This requirement for effort is induced by the repetition of appropriate exercises and training with additional charges, both concepts being geared to enhance the athlete's most important physical qualities.

Our colleague Andrivet, of the INS, quipped to this effect: « Time was when one practiced sports in order to achieve muscular development, now it is the other way around ». If muscular development has been in the limelight during the past few years, it can by no means be called a recent discovery. To bear this out, let us revert to the past: In the 6th Century B.C., Milon of Crotone, a man endowed with above average strength, used to train for combat by lifting daily a young bull, which naturally grew heavier as it aged. Rabelais' famed Gargantua was handling « impressively heavy objects which he called weights ». And, closer to our times, Amoeros, inspired by Jahn in Prussia, may be considered the real pioneer of musculation: He created a Sports School for Officers at Joinville, where instruction was based on a gymnastic method drawing no line between musculation and use of sports gear.

If the term « musculation » had not yet been coined at the time, as far back as 1910, the training of marks- men in France included « educational movements » with charge, the charge in this case being the rifle itself. These « movements » were part of the muscula- tion program of those days.

The effects of musculation

The development of physical capabilities obviously results in improved sports performance. We all know that the physical capabilities to be developed are: power and stamina, which is the ability to perform a given task within a predetermined period of time; resistance, which is the faculty of sustaining an effort requiring a large amount of oxygen intake; endurance, which provides for a slight effort over a long period of time and which consists in striking a balance between the intake and output of oxygen; speed; and, lastly, muscular flexibility.

Certain qualities readily respond to training, as, for instance, power and resistance. Others, however, are harder to improve on, as is the case for speed (and relaxation).

Pichon, a specialist in the matter since 1928 and currently instructor at the Paris INS, advocates that power development be promoted through use of very heavy charges (80 to 90% of the maximum) with slow motions, low rate of repetition (1 to 3) and long breaks (3 to 5 minutes). Stamina is heightened with charges varying between 70 and 80% of the maximum, a fast tempo. Repetitions ranging from 5 to 6, and 2 to 3-minute breaks. A similar approach for speed, although charges fall off to 60-70% of the maximums and repetitions rise to 5 to 8; for resistance (a must for the medium distance runner), charges fluctuate between 40 and 60% of the maximum, the tempo is lively, repetitions go from 5 to 20, and breaks are not to exceed one minute; endurance calls for light charges (20 to 30%) slow execution, emphasis on repetitions (20 to 30), and very short breaks.

The beneficial impact of musculation on physical capabilities is explained by the fact that it is conducive to changes at the muscular level. Muscular training results in an overall modification of the muscle structure: it alters both the muscle's shape and its volume. Certain authorities claim that the number of specialized fibers increases in function of the effort produced, which is known as a process of neoformation; others contend that the phenomenon is confined to the development and specialization of existing fibers (histologists, for instance, have been unable to uncover any sign of cellular division).
At the 1966 International Colloqy in Vichy, Doctor Dumas stated « depending on the type and distribution of effort, there occurs a disparity between the development of slow-contracting and rapidly contracting fibers. The shape and importance of the muscles are believed to alter in function of changes in the clinical and histological constitution of the muscular fiber. These changes are in turn governed by the type of exercise performed, the addition of charges leading to an increase in sarcoplasm ».

Thus, while a change in contraction tempo is primarily traceable to various enzymatic reactions triggered by the type of effort produced, the excessive augmentation of sarcoplasm entailed by intensive effort serves to decrease this quantity. During the process of contraction and relaxation, the sarcoplasm infiltrates through the maze of smaller fibres and, flowing alternately from the center to the extremities, provokes a breaking action on the muscular contraction. This phenomenon of increased visco-elasticity in turn brings about a decrease in speed.

In a publication entitled « Modern Training », Louis Fauconnier argues that the body adapts to various demands:
- an increase in power translates itself by an overall expansion of the muscle (more power per square centimeter remaining unchanged);
- greater endurance is a by-product of a general improvement in the blood circulatory system and action at rest, and a better oxygen supply.

A combination of the above-mentioned performance in the ‘steady state’.

This process of muscular adaptation is characterized by a significant increase in cardiac capacity (sympathetic output rising from 120 to 200-230 cm3/minute) which may bring it up to a ratio of 55/minute in the course of average effort in training (NOCCE). Thus, improved resistance implies a higher tolerance to the oxygen debt, which is achieved through an increase in the readily available reserve of energy.

The proper selection of exercises and an apt program of execution will therefore be determinant in achieving coordination between the motive system and the vegetative functions.

Muscle capillarity and muscle chains

The research carried out by Benassy analyzed the radicular distribution and nervous motive impetus of the limbs. In so doing, he stressed the important function of muscle chains which, in Dumas’ opinion, warrants the classification of muscular development into:
- Phase I: period of development of the muscular mass and improvement in muscle quality.
- Phase II: chain action of the muscular structure.

Certain muscles (deltoid – frontal tibial) appear to be monoradicular; others (as for instance the pectoral) are pluriradicular, but, in that case, one root predominates: « a same root intervenes only sympathetic muscles » (Paul Bert). Although the frontal tibial acts as dorsal flexor of the foot and the rear tibial as extensor and dependent on I.A., they are in fact synergic in the foot addition.

Dumas, for instance, demonstrates that six muscles are dependent on the C.S root — i.e. deltoid, upper spinal, biceps, frontal brachial, long and short supinator. They constitute a long chain of muscles spanning from the shoulder-blade — collateral bone to the radial styloid. Their respective actions are: outward rotation of the shoulder, arm adduction, forearm flexion, supination. The combination of such distinct moves results in a global action, the concrete version of which may be a handball throw.

Place of isometric muscle in physical training

Most musculature methods rest on motion (dynamic isometric contractions). However, isometric musculature (contractions without movement of the osseous levers) may find its place in training and the method be considered as a useful complement to dynamic musculature: it allows an economy of time and equipment. Some specialists believe that it should represent 10 to 15% of the musculature effort. This type of effort consists in exerting a more or less strong tension on an immovable resistance over a given period of time.

Huttering and Muller (Germany) contend that optimimum results are obtained by a single daily contraction of 6 seconds, at 2/3 of maximal power. According to Battista, six to eight exercises should suffice to put the main muscular groups into play and the same exercise must be performed in three different positions from three different angles varying according to the specificity body area under consideration.

Observing the results of isometric musculature on a soccer team, Frank noted that, in addition to the benefit of muscular development per se, the players became immune to muscular accidents.

Medico-physiological control and musculature

Musculature having become an integral part of the « Jeuneville Battalion » training programs, regular medico-physiological control brought to light, as far back as 1963, the overall beneficial effect of musculature (Biometry, tests of cardiac capacity for effort — Black-Maritime) and, more specifically, two types of phenomena:

- changes in neuro-muscular excitability
- changes in the cardiac condition as reflected by cardiograms.

I. Neuro-muscular Excitability

The first observations were made on a Basketball team in their twenties, of above average height, and who had been playing Basketball for several years without any definitive musculature training. Subjected to a musculature program geared to power development, a monthly check-up of the players revealed a significant narrowing of the curve of musculature and nervous excitability. There was even, in certain cases, a full inversion of these curves. It is to be recalled, in this context, that these curves are drawn by means of an electronic rhotome: one muscle and one nerve (in this instance the frontal tibial muscle and the external popliteal sacric nerve) are excited by a current of the order of 1/1000 amperes and responses to the stimulation are recorded in thousands of seconds as a rule in periods of physical fitness, the muscle is hypo-excitabile and the nerve hyperexcitabile.

Examinations put at the end of the third month that the curves showed signs of stabilization.

This indicated that if a form of fatigue particular to musculature had taken place. During the same period, the coach noted that his athletes displayed poor coordination and obvious awkwardness.

On the fourth month, everything was back to normal and the athletes showed an average ponderal pick up of 2 kgs.

Thus, these national caliber athletes did in the end derive a benefit from musculature — that of increased muscular power at the end of three months. In the intramural population, whose base performance was definitely affected. If tests on other type sportsmen revealed lesser reactions to musculature, some signs of disturbance were nevertheless present.

II. Musculature and Cardiac Condition

A special technique — bolisto-cardiography — provided the subject's cardiac conditions; this is done by means of an accelerometer, the subject being stretched on a floating table held aloft by pressurized air. Heart becomes possible to record body motion to be promptly by the ballistic forces (backup and impact) generated by cardication. A calculation based on the body volume and the rate of acceleration gives a result in terms of force, which is in turn translated into the evaluation of the subject's cardiac condition. In this context, it was noted that physically fit subjects produce high figures, while cardiovascular deficiency is evidenced by correspondingly lower digits.

Further research carried out in cooperation with Dr. Chignon, head of the National Sports Institute Research Department, revealed that musculature improved the cardiac condition and that the general condition as related to bolistic force showed definite signs of improvement as the subject underwent regular and supervised musculature training.

Dangers of Unsupervised Musculature

Musculature by means of heavy charges may, in the absence of qualified leadership and medical surveillance, lead to severe disturbances:

- development of atonic muscles without corresponding gain by antagonistic muscles, which not only disrupts muscular harmony, but may well provoke disequilibrium;
- muscle development without parallel strengthening of the tendons which might for instance explain the higher incidence of tendinitis and teno-synovitis or even ruptures among athletes.
- overreaction whilst training with charges may entail changes at the level of the tendon's pericellular insertions, appearing as calcification (at the olecranon level for throwers, and that of adductors for soccer players, etc.);
- work with charges may, in the case of young individuals, cause a deformation of the fusion cartilages, and abnormal development at the level of condensation. Thus, X-rays of X-Mays revealed that the Jouville weightlifters were afflicted with noticeable malformations of the spine (of the weightlifters in question, aged 20, and having practiced their sport for a period of 4 to 7 years. 7 out of 10 were affected);
- improper performance of certain exercises (for instance squats) may provoke lumbar afflictions, and lumbago in the intervertebral discs. Heavy charges may accentuate the physiological vertebreal curvatures (squating places the lumbar column in cyphoze, weightlifting in an erect position accentuates lordosis);
- experiments carried out by Gvartia showed that isometric contractions induce an important oxygen consumption, but that the oxygen debt after effort was also larger, which proves that static action requires a long period of recovery.
According to Professors P. and G. Salladaur: "La violent static effort with suspended breathing and blocked expiration after forced inspiration, or rather often an arterial hypertension to the tune of 20-14, which opposes ventricular evacuation. One concurrently notes a definite increase in systolic volume, accompanied by a slight augmentation in diastolic volume. When improperly controlled, isometric musculature also entails a secondary blocking of the thoracic frame and may provoke pulmonary diseases (such as tuberculosis, for instance)."

The pursuit over protracted periods of time, isometric musculature may result in an accretion of nervous disorders which should have no place in the rational training of a true sportsman. Lastly, musculature with charges provokes an intense fatigue which requires more rest and a diet richer in calories.

Methods of musculature

Several methods have been devised on the basis of the fundamental principles of musculature:

- Weightlifting methods;
- The U.S. Body Building System;
- The Circuit Training;
- The Power Training, a component of the Total Training as advocated by CSM’s Secretary General Mr. Mollet.

a) The Weightlifting Method

- Based on weightlifting motions:
  - raising both arms;
  - lifting with both arms shoulder-level action with both arms;
  - lifting and shortening with one arm.

The charges are high and the number of repetitions varies between 1 and 4.

Each exercise is executed in series of two or three; the tempo is slow; pauses of 2 to 5 minutes are allowed between series.

b) The U.S. Body Building System

- Includes a large number of exercises broken down in circuits of ten.

These circuits provide for either general muscular development, or else for that of given muscular groups of special importance in certain sports.

This method permits personal adaptation, each individual being in a position to execute several series in the course of one session. Breaks between exercises range from 2 to 5 minutes.

c) Circuit Training, as per Morgan and Adamson

- Is designed to be both effective and attractive.

Circuit training is essentially geared to overall development; however, this method also lends itself to emphasis on the perfection of basic muscles such as strength and power, resistance and endurance (with possibility of precedence).

- For strength exercises without heavy charges are executed in series of 8 to 10 repetitions;
- For power, single exercises with heavy charges, executed at a fast tempo, in series of 10 to 15 repetitions;
- For muscular resistance, light charges and series of 20 to 30 repetitions.

Endurance is generated by the sum of continuous effort required by the three circuits.

d) Power Training

Putting an end to empiricism, Raoul Mollet consolidated the modern training concepts and methods and brought forth what he deemed "total training" in his publications respectively titled:

- Gross promenade;
- Interval Training;
- Power Training;
- Training Log Book.

The purpose of Power Training is primarily to develop muscular power. Three categories of exercises are proposed to this end:

- Exercises with heavy charges (bar with belts);
- Exercises with medium charges (medicine ball);
- Exercises with body weight (ambulances or twirling).

Here again, circuits may be geared to either general or local action.

Other methods were conceived with a view to improving physical training in the Armed Forces:

- The gymnastics program of Capt Garret (I.L.S.A.), which is not based on circuit training and overemphasizes isometry (150%);
- The Canadian Air Force’s I.R.K. program, which respects age brackets, and includes 5 exercises: 1st exercise: based on stretching and relaxation; 2nd exercise: for the development of abdominal muscles; 3rd exercise: for the development of dorsal muscles; 4th exercise: for the development of shoulders and arms; 5th exercise: for leg development and improvement of the cardiorespiratory and cardiovascular systems.

It is nevertheless advisable to complement this program with one or two sports left at the discretion of each individual. Moreover, the exercises themselves appear to be void of attractiveness.

Practical application of circuit training methods

- Implementing the concepts of Morgan and Adamson, training circuits were successfully tested at the Ostend College, and at the Swedish Military School of Physical Education.

- After two years of research and tests on the Morgan and Adamson’s Circuit Training and Major Mollet’s Power Training, the U.S. Marine Corps has recently adopted a version of Power Training.

- In France, testing of a training circuit was carried out within a mechanized infantry regiment. The results were such as to warrant consideration of this training program, the technical premises of which were presented by Capt Gellion during an E E P M Clinic held in Antibes, in 1966.

Circuit Training proved itself effective in the context of physical training, inexpensive on the national level, and practical from the standpoint of organization and implementation. Furthermore, Gellion points out, it has been most favorably received by both the cadre and the recruit.

Training circuit exercises: Gellion saw fit to establish 3 circuits of progressive intensity, to be them-selves subdivided into three phases of progress.

Whereas, for instance, one weekly session may suffice for units in training, their sedentary counterparts will, of course, require three times as much.

Gellion’s method provides for warming up activities prior to execution of the circuit exercises: running, skipping and calisthenics.

1st exercise — « step test » in four phases, with possibility of added charge.

2nd exercise — consists in:
  a) jumping up, arms pressed on parallel bars;
  b) progressing on parallel bars;
  c) flexing and extending arms on the bars.

3rd exercise — squats with heavy placed across shoulders.

4th exercise — with horizontal bar:
  a) traction on horizontal bar;
  b) traction followed by a flip.

5th exercise — clearing of 4 hurdles (height 0.60 to 0.80 m. distance 1 m).

6th exercise — abdominals with twisting of the torso:
  a) stretched on back, hands folded under the head legs slightly bent;
  b) stretched on inclined board (30°) with head downward and hands behind the head.

7th exercise — forward and backward rolling.

8th exercise — dorsal exercises, resting on board, face down, hands in back of head — with or without charges.

9th exercise — Rope climbing:
  a) with leg support;
  b) without leg support;
  c) climbing on double rope without leg support.

20th exercise — squatting followed by vertical jump:
  a) arms along sides;
  b) hands folded behind the head.

11th exercise — abdominals:
  a) prone position, with arms along sides, raise stretched legs to a 90° angle;
  b) on a 45° inclined board (head up) raise stretched legs to a 90° angle.

12th exercise — push ups:
  a) standard with position;
  b) with feet propped on a 50 cm high bench.

14th exercise — hold backward until hands touch ground.

16th exercise — lifting and raising heavy bar.

15th exercise — Russian dance.

Gellion thus established three distinct circuits (identified by the colors blue, white, and red).

Each circuit is comprised of several phases and a given number of repetitions is allotted each phase. Thus a program can be established for each individual as dictated by his age and capabilities. Exercises for unwinding and muscle relaxation consist in jog-ging and rest with deep expiration. Exercises are followed by a shower.

Gellion has also compiled a series of additional exercises which allow for the circuits to be modified. We consider this a wise decision for two reasons:

1) it has been noted that endless repetition of the very same exercises gradually becomes ineffective;
2) the absence of musculature, as could be provoked by this repetition of always identical motions, is to be avoided.

Thus, he proposes exercises with a Medicine Ball (in various positions), exercises with short dumbbells.
exercises with weightlifting bar, and, lastly, a group of miscellaneous exercises (e.g., squats, jumps, etc.). Each exercise, as codified by Gellot, is given an anatomical classification and is included on a diagram indicating the muscle group it activates.

The advantages of these circuits lie in:
- short duration: the shortest circuit takes 24 minutes, the longest approximately 32 minutes.
- control is possible at the end of the session; pulse reading by the individual himself immediately upon cessation of activity, after a 5-minute rest.

Any abnormality must receive medical attention.

Circuits of the type described above are based on modern training methods and geared to the mass of Army personnel who, by virtue of their respective assignments have neither the time nor the possibility to devote much effort to physical training. The above exercises are therefore meant to make up for such shortcomings.

However, while modern training methods are effective in the development of basic physical assets and muscular power, the element of motivation must be instilled by the cadre in charge of such programs.

Anatomic classification of exercises

The effects of a given exercise are often multifaceted, for one cannot overlook the functional unity of the human body.
The following chart therefore indicates the primary effects of given exercises on the main muscular groups.

**Circuit training exercises**

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Rear Torso muscles</th>
<th>Torso musculature</th>
<th>Frontal Torso musculature</th>
<th>Upper limb musculature</th>
<th>Lower limb musculature</th>
<th>Organic impact</th>
<th>Neuromuscular coordination</th>
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<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
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<td>2 a)</td>
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<td>x</td>
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<td>4 a)</td>
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<td>6 a)</td>
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<td>9 a)</td>
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<td>11 a)</td>
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<td>12 a)</td>
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<td>14</td>
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<tr>
<td>15</td>
<td>x</td>
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<table>
<thead>
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<tbody>
<tr>
<td>1 Step-Test (5 kg charge, 50 cm high bench)</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>2 Parallel bars: jump with arm prop, followed by flexion and extension of arms</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>3 Squat (with 50 kg charge across shoulders)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>4 Horizontal bars: Traction</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>5 Hurdle clearance (4 hurdles, 0.70 m high and at one meter intervals, each jump counted as a repetition)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>6 Abdominals on 30° inclined board (head down, hands behind the head)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>7 Rolling back</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>8 Dorsals (with 5 kg charge on the back of the neck)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>9 Rope climbing (without leg support)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>10 Squatting followed by vertical jump (arms along sides)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>11 Abdominals (on ground, arms along sides)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>12 Push ups</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Designation of exercises</th>
<th>R S 1</th>
<th>R S 2</th>
<th>R S 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Step-Test (without charge - on 50 cm high bench)</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>2 Parallel bars: jump with support</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>3 Squat (with 50 kg charge across shoulders)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>4 Horizontal bars: traction followed by FLIP</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>5 Hurdle clearance (4 hurdles, 0.60 m high and at 1 meter intervals), each jump counted as a repetition</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>6 Abdominals on ground, feet maintained in place and knees half bent</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>7 Rolling (forward and backward)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>8 Dorsals (with 10 kg charge on back of neck)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>9 Double rope climbing (with leg support)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>10 Squatting followed by vertical jump (hands behind the head)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>11 Abdominals, with board inclined at 30° angle (head down with 5 kg charge on back of the neck)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>12 Push ups (with feet resting on 50 cm high bench)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>13 Bend backward until hands touch ground</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>14 Raise a 35 kg bar (initial position with bar at chest level)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>15 Russian Dance (each hop counting as a repetition)</td>
<td>x</td>
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<tr>
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<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>2 Parallel bars: arm flexion and extension</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>3 Squat (with 50 kg charge across the shoulders)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>4 Horizontal bars: traction followed by FLIP</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>5 Hurdle clearance (4 hurdles, 0.80 m high and at 1 meter intervals, each jump counted as a repetition)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>6 Abdominals with board inclined at 30° angle (head down with 5 kg charge on back of the neck)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>7 Rolling (forward and backward)</td>
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<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>11 Abdominals, with board inclined at 30° angle (head up-raise stretched legs to 90°)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>12 Push ups (with feet resting on 50 cm high bench)</td>
<td>x</td>
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<td>x</td>
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</table>

R S 1: Repetitions in 1st stage of Progression.
R S 2: Repetitions in 2nd stage of Progression.
R S 3: Repetitions in 3rd stage of Progression.
First Conclusions

Gentlemen,

Representatives of 28 International Military Sports Council Member Nations presented the physical training concepts, achievements and prevailing trends adopted or under consideration in their respective Armed Forces.

At the conclusion of these interesting deliberations, it seems appropriate to consolidate and compare the various concepts advanced. As an initial step to this end, I have segregated the data on hand into two main categories, i.e., those ideas representing a consensus and which do not readily lend themselves to controversy, and, as a separate group, problems which generated divergent or even conflicting solutions.

I. — Under the heading of unanimously accepted concepts:

1) Modern training presents three closely related aspects: technical, psychological, and medical.

   In our day and age, sport is becoming an actual way of life which is rendered all the more necessary by the characteristics of modern life and their adverse effect on both body and mind.

2) Modern training techniques produce not only faster, but also more evident results.

   Through its impact on the cardiovascular system, fractional training results in increased endurance and a speedier process of recovery after exertion. Guided muscular development brings power, while collective games and certain exercises improve reflexes.

   A program in which the various procedures are rationally distributed brings about predetermined results. Today’s training is no longer left to chance, but rather calls for controlled, almost scientific supervision.

3) Notwithstanding the value of these new methods and their direct or indirect application to the soldier’s physical training, Representatives of the various Armed Forces — for the most part in charge of Physical Training at the policy making level — all frankly admitted that giving physical training the place it deserves was not an easy task. This was traced to inadequate infrastructure, lack of specialized personnel, financial considerations, and, last but not least, the indifference of commanders, often unaware of the new aspects of the problem.

4) Training must be attractive; it requires pedagogical qualities on the part of the instructors. Too often considered a duty, an inescapable nuisance or even a punishment, it can and should be based on free acceptance. «Sports motivation» is the pre-requisite to promote such willingness in the participants.

5) The low physical fitness level of young recruits and their lack of interest in sports are stressed by many an observer. Men in the 20th century seem to fall into two categories: the increasingly skilled athletes, and the others... the majority, which, at the age of military service, leaves much to be desired in the area of physical fitness. It is evident that this latter element deserves first priority.

6) The medical aspect of sports is particularly important in the case of older personnel. The training programs are seldom conceived in terms of age and category of participants. However, all agree that the principle is well worthy of consideration.

II. — Divergences

1) The most important hinges on the definition of the role of sports and physical training in the conditioning of the soldier.

   a) A certain faction contends that physical training must be directly linked to combat readiness, and be geared to strictly practical and concrete results. To the defenders of this approach, Physical Training should consist in such activities as grenade throwing, bayonet fencing, hand to hand combat, etc., while sports as such represent but a means of relaxation.

   b) Another standpoint, supported by the majority, is that beyond its relaxation aspect, sports is a vehicle to promote physical, mental, and medical fitness which, in turn, pave the way for faster and more effective professional training. The latter is undeniably based on a great deal of physical activity, but is not primarily designed to strengthen the body.

   In this context, for instance, it is considered more rational and effective to strengthen the arm and shoulder muscles of the future grenade thrower by purely technical procedures, rather than have him toss the projectile without preliminary conditioning.

   c) In essence — and this will very likely be one of the most interesting revelations at this symposium — it seems that two types of training could be envisaged, geared to the time available for the program, i.e. whether applicable to peace or wartime, or in the event of crisis.

   — If there is no urgency and a full year can be devoted to form a soldier, the second method appears preferable inasmuch as it produces »true sportsmen«, reservists-to-be, who will enjoy a higher degree of physical fitness over a longer period of time. Being more thorough, this method generates more lasting effects.

   — However, when it becomes necessary to train a soldier in several months, if not weeks, it appears advisable to settle for less attractive and more superficial methods, with the sole purpose of ensuring the trainee to the basic requirements of his profession.

2) A long time subject of controversy is whether or not a selective sports unit has its place within the Armed Forces.

   In the eyes of some people, such task does not fall within the combat training mission and is the realm of civilian concern.

   Supporters of this concept consider that this is a national goal which, in fact, extends beyond military responsibilities and contributes, above all, to the training of a country’s sports elite. They do, however, note — and this bears no denial — that experiments carried out on this elite benefit the masses, whether in the context of dietetics or training methods.

   * * *

In order to draw a conclusion, I shall endeavor to reason from a Staff Officer’s or, better yet, a serviceman’s standpoint. Such point of vantage seems the most appropriate since sports in the Armed Forces must necessarily have a practical application in the physical conditioning of our personnel.

A soldier — I mean a good soldier — is a young and cheerful individual; he does not worry without reasons. Enjoying good health, a high degree of physical endurance and a good process recovery, he must have an excellent morale and the utmost confidence in his leaders, and more particularly in his immediate superior.

A troop leader is also young and cheerful, and also should not be weighted with problems, for his trade — despite the tyranny of technique — is basically simple. He instills his enthusiasm and faith in the men under his command. He knows his men well and is capable to do himself what he asks of them, from the humblest of chores to the sacrifice of his life.

On the basis of these human traits — physical and mental — the leader and the subordinate must acquire a technique, reflexes, and movements of an essentially physical nature in the case of the combat element, more complex and intellectual within headquarters, and specialized units.

However, in the absence of basic human qualities, professional training would prove futile in difficult circumstances. Establishing such training without having provided this indispensable foundation would be but building on sand.

Conversely, the three characteristics of modern training — technical, psychological and medical — provide an easy means of developing the human qualities required of a warrior:

Dynamism, endurance, reflexes, the will to win, a taste for effort, but also relaxation, equilibrium and good health... are these not the rewards one may expect from today’s sports if those practising it are motivated by sportmanship?
It is this « sportsmanship » — so hard to achieve, but perhaps not quite as unattainable when training assumes a more inviting aspect — which determines the success of a unit and its cadre. Once this spirit exists, it no longer matters — or very little — if infrastructure is inadequate or specialists scarce. It is common knowledge that a basic unit is the reflection of its direct supervisor: if he happens to be a sportsman, his subordinates will follow suit before long. Example, in this area, is contagious.

It must be added that modern physical training for the soldier — who lays no claim to high level performance — requires but a limited amount of time. Half an hour of intensified daily training coupled with a weekly two-hour session will serve to reach the proposed goal.

This simple but pertinent analysis may carry weight with some superiors heretofore unreceptive to such problems: still thinking in terms of the old methods which admittedly were rather fruitless, they all too often are unaware of the new role sports may assume in military training.

In conclusion, I wish to thank all the participants on behalf of our President. Through their contribution, this symposium became a week of whole-hearted effort which will prove beneficial to all of us. They prepared their presentations with much care and displayed genuine talent. The International Military Sports Council has thus demonstrated that it is capable of dealing with general problems extending beyond those of mere technique.

Colonel G. LE BORGNE