

The most marked change physiological change in Smeat was the 19 pound ~~not~~ weight loss, incurred by the S.B.T. during some 90 days of ^{eating} the S.L. diet. ~~Since~~ Unfortunately there appears to be a good of confusion or misinformation surrounding this event the following ^{information} ~~statement of events~~ ^{may help} put The following is a somewhat ~~to~~ lengthy description of this in its proper perspective. this process.

The S.B.T.'s ^{normal} adult ~~not~~ weight was 207 # ^{and} ~~had not changed~~ unchanged from ~~to~~ the weight at which he had played collegiate football. He was in reasonably good condition
~~1 # at start of diet was~~

2

at the time of starting the diet with
 max. O_2 uptakes of approx ~~50~~ 50, ml/Kg./min.
 capable of sustaining 400 watts ^{min} on the
 for 3 mins. on a bicycle ergometer and
 with ~~undisturbed~~ ^{jogging} mile ^{times} of 7:30 - 7:40
^{mins./mile to} ~~for and~~ ^{mins./mile} 7:50 to 8:00 for ~~longer~~ ^{status} 3 miles
 3-4 mile runs. This ^{status} required ~~8-10~~
 miles week ~~running~~ ^{jogging} interspersed with frequent
 2-3 runs/week on a bicycle ^{ergometer for 45 mins to} of up to an
 more than an hour at 300 to 275 ~~watts~~ ^{loads} ~~hour~~ at ~~280-300~~ ^{275 to 3} watts or with shorter
 max. effort, and occasional some weight
 lifting and handball. ^{with relatively little carbohydrate.} Diets were high protein.

It had been planned to be in chamber

1. ~~at an actual~~ All uptakes quoted are either measured at 170 heart rate or extrapolated to that value.

exercise plan was to maintain ^{performance} ergometer^s and cardio-vascular status with whatever loads and times were required. ~~without~~ ~~None of~~ This was discussed with ~~the~~ pertinent investigators and no objections were raised.

~~From the day the first~~ Repeated at every level attempts were made, to point out the inadequacy of the proposed diets ~~or~~ especially after marked losses and acute hunger ^{during} the two trial periods. At that time no interest could be evinced in exercise, previous diets or physical condition. After repeated attempts to

~~At the~~ ~~begin~~ It. was 209# when
 beginning the diet with the 2# above normal
 accumulated by numerous ~~and~~ dietary indiscretions
 during the preceding week.
~~large meals~~ ~~is~~ ~~in~~ retrospect an ~~action~~
~~maneuver~~ which should have been started
~~a couple of months earlier.~~ After the
 first week a more or less stable loss of approx.
 1 1/2 lb./week was established. ~~This would have~~
~~been much larger except but~~ During the last
 month prior to chamber entry ^{normal amounts of} time for ^{exercise} ^{pre-test}
 was simply not available otherwise the ^{loss}
 would have been much greater.

Body composition was determined by

~~see~~ radio-isotope studies just prior to chamber entry and are given in Table — of the M073 report. No other of body size configuration or composition measurements, were made except some extremely crude girth measurements by the S.P.T. ~~During~~ During this pre-chamber tests frequently period the basic diet was, augmented with up to ^{four} ~~three~~ cans per day of sugar/bo ^{non-restricted} ~~for non-restricted~~ 'sugar cookies'. Hunger was constant. ~~No interest in~~

1. One valid girth measurement is that of the ~~lower legs~~ & maximum calf dia. which ~~is~~ was recorded for each M092 run.

the SPT set the
 Due In the chamber, exercise was
 approx. 15×10^3 Watts ^{min}/day
 set at, a level estimated to be, roughly,
 total work
 to that on the, energy expenditure immediately
 pre sweat - not at the much higher level
 before the diet was begun, Rate of weight loss,
 except for a period of about one week
 when no ergometer was available for exercise,
 remained constant at the pre chamber
 level. After two weeks in the chamber
 this amount of
~~exercise level total total work~~ could only be
 achieved by reducing work levels loads and
 increasing duration. & Shortly after this
 there was cramping of the lower legs

associated with flexion of the foot. This was a phenomena never previously experienced, even transiently, but which persisted for some three weeks after ending the diet. There has been no recurrence. Electrolyte levels were unavailable since a protocol for determination had not been agreed upon.

Approx On day 21 the SPT was requested for the first time to increase his caloric intake at least ~~by some~~ 300 calories/day utilizing the 'free' ^{such} food items. At that time the only ^{such} high carbohydrate items which could be tolerated were sugar cookies and mints ~~and~~ ^{but} until just prior to test end the diet was augmented approx. 400

B

calories day with these items. ~~In addition~~ In spite of ~~an~~ acute hunger it became a problem of force feeding to ingest and retain this material ^{the force of} in ~~addition~~ to a diet formed in large part by ~~cook~~ vanilla wafers, puddings, crackers, jams lemon drops and imitation fruit beverages.

~~As might have been predicted~~ ^{caloric increment} ~~was~~ This relatively small ~~decrement~~ did little to arrest the weight loss. At ~196 pounds all factors were considered with the flight surgeon and a contingency electrolyte ^{the diet} sample run. ~~It~~ ^{It} was decided to continue, until reaching 192-3 #.

On leaving By the time of ~~the~~ chamber descent

After chamber descent Post chamber large quantities of butter were added to every conceivable (and some inconceivable to the SPT) food item. ~~At the same time~~ At this time

~~At this time~~ Post

max. O_2 ⁴⁷ ~~ml~~ uptakes were down to ~~40~~ ⁴⁷ ml/Kgm.
^{sigometer}
 max. work loads were 6-7% down and

prolonged performances were markedly reduced

with ~~1/2~~ mile jogging times for O 3-4 miles in
 in the ~~re~~ 10 to 11 min. region. ^① At this

time ~~exercise~~ ~~his~~ distance a min. of

miles a day a regimen of 3-5 miles

day of jogging was instituted since it was felt

① see rear

① At chamber exit repeated radio isotope
calculated
studies of body composition are given
from table
shown in table VI of MD73 and revealed an in chamber
loss of ~~2.4~~ ^{2.4} KG lean body mass and
4.8 KG loss of fat ^{body} & a fat percentage
of $\sim 10\%$ or a reduction in of
 $\sim 4\%$. An independent ^{specific gravity} ~~gravimetric~~ lean
body mass determination by the Cooper clinic
confirmed the ^{bodyfat} 10% fig. to a ^{small} fraction of a
percent. It should be noted that these
were end of chamber and not end of diet determinations
which would have shown even greater lean body losses.

'409
190
19

9 A

that the ~~also~~ deconditioning might ^{conceivably} have
resulted from confinement. and height loss
~~loss~~ ^{continued} continued and at 192 and the S.P.T.
~~with~~ agreed to terminate the diet at 190 pounds.
Additional food was found and the diet ~~was~~
became ad lib S.L. food - ^{quantities of} Although large
lobster ^{fruit} beef and vegetables produced a
weight gain of 2 # in ten days and
the first hunger free day in 3 months, there
was no improvement in physical performance
for approximately 2 weeks after go comp
beginning normal foods. Leg cramps
took even longer to clear. ~~It~~ It

After final S.L. diet termination

(even with
Height gain was prompt ~~and~~ ~~at~~ 5-8 miles/day ~~running~~ ~~and~~) on a meat ~~so~~ fresh fruit + vegetable diet
and after approximately one month pre-S.L. diet
~~was~~ performance indices were exceeded.

Comments - It was obvious that the diet was inadequate to maintain weight and avoid severe hunger from the two trial diet periods. The 19th ~~not~~ weight loss only further confirmed this. Questions have raised ~~whether~~ whether that the SPT's exercise was excessive, especially after sugar cookies, lemon drops + mints failed to stem the loss. It had been pointed out ~~repeatedly~~ ^{pre-test} ~~repeatedly~~ that the S.P.T. ~~did~~ ^{regularly} ~~engage in~~

~~such efforts levels which in fact we~~
~~should perform maintain~~
~~plan to maintain reasonably high levels to~~
~~work loads to avoid~~

One can only answer that ~~levels performance~~
 or 400 W/min work load performance
 O_2 uptakes of 50 ml/Kg, cannot be
~~maintained~~ maintained by playing tiddly winks,
 that the work loads were normal or even
 modest for the subject, that no one had
 raised objections pretest and that in spite
 of ^{this} supposedly 'excess' ^{physical} work, conditioning ~~or~~
 deteriorated.

① ~~Here as we have some interpreted~~
 the loss as The loss has been interpreted

as simply excess fat. The first 6-8 p
 6-7 pounds may well have been in this
 category however, ^{beyond this} such an interpretation ^{specific gravity} is
~~not~~ contradicted by the radio-isotope and
 studies ~~which were~~ ^{They are} a simple fat loss
 should ^{least a 10} ~~would~~ have resulted in at 0% improvement in

max. O_2 uptake when in fact there was
^{an approx 5%}
~~a 0% de~~ in fact a 10% decrement. One
~~could argue that no~~ The creative data did
 not support a negative nitrogen balance but
 unfortunately several other aspects make this
 data very questionable.

The ~~same~~ ^{rest} arg The only relevance

real significance of this ~~facet of the test~~
is its relation to S.L.

There are S.L. prime crew members
as large, who ^{require} ~~consume~~ ^{as large great} quantities of food, and
maintain physical condition at least as well
as the SPT. No matter how important a balance,
study ~~so~~ crew ~~oper~~ performance is much
more crucial than a single experiment and
~~weight loss~~ an operational mission is not the
place to perform a weight reduction program
nor especially ~~any~~ can any reduction in condition
~~performance~~ be induced. The diet as constituted
for S meat with ^{fixed &} ~~unavoidable~~ ~~any~~ ~~on~~ mineral

and protein levels as is probably adequate for ~~small~~ individuals ~~of up to 1~~ requiring no more than 2800-2900 cal. day. Beyond that increasing quantities of 'free,' carbohydrates are required. There are ~~simple physical~~ limits to which such items can be tolerated, even with force feeding. It is understood rectification of these problems are ~~under~~ in progress for S. L.

i.e. free of all food value except calories