

HOW MIKE BURTON TRAINED AT ALTITUDE (7060')

By Major Paul F. Arata
Air Force Swimming Coach

Ed. Note: Major Arata has compiled a workout diary of the high altitude training schedule of Mike Burton prior to the U.S. National Championships and Olympic Trials.

Mike Burton arrived at the Air Force Academy on the 8th of May. He intended to stay for about one month before returning to Arden Hills. His workouts were to begin in a 25 yard pool and progress after improvement to a 33 1/3 yard pool. Sherm Chavoor and I agreed on both the initial workouts and on the days when I would increase or decrease his workouts. The objective by mutual agreement was to slowly tear him down immediately following any big improvement. This improvement came on the 12th day and the teardown began. Although the teardown was complete, he did show flashes of form on occasion and was particularly sharp on the 21st, 23rd, and 24th days.

The workouts devised for Mike were both quantitative and qualitative. Seventy-five percent of everything that he did was timed and compared to his previous workouts. He had full knowledge that he did a specific group of times on a specific part of a previous workout. This tended to motivate him and keep him pressing. Everything he did and the way he felt were recorded. He swam by himself most of the time and this, coupled with a sore elbow during the first week, probably played an important part in the statistical outcome. Significant drops in time were found quite often after the third day.

Mike completed 49 full workouts in the 29 days. He missed the tenth day completely (he loosened-up) and swam an exhibition 1650 on the 11th day. He normally had only one workout on Saturdays and Sundays. The Sunday workout was always a short workout of 4200 yards. Despite his altitude adjustment problems, he averaged 6212 yards per workout. He swam a low of 4200 yards in a single 2-hour workout and a maximum of 7433 yards in a single workout. His maximum for any single day was 14,200 yards. Mike feels that 14,200 yards at 7000 feet is equivalent to 17,000 or 18,000 yards at sea level.

Mike said that during his stay, he improved at a steady rate in both his conditioning and his psychological outlook. These two factors were the basic objectives of the program. Due to space limitations, his workouts, times, and pertinent facts have been cut down to include a workout by workout diary of both his feelings and some of my observations.

9 MAY 1968, MORNING, 1ST DAY, 25 YARD POOL: - He arrived yesterday afternoon but did not begin workouts due to tiredness. I feel this workout was not bad. He experienced difficulty on 400's and had other problems with interval being too short. Our boys perform better than this during season with less rest on occasion. They are not in a class with him therefore, he obviously has been the victim of both lack of air and possible Psych.

10 MAY 1968, MORNING, 2ND DAY, 25 YARD POOL: - He had trouble today, therefore, I made adjustments in the intervals but not the distance. The second day looks bleak at best for altitude swimming. This is not at all surprising to me.

10 MAY 1968, AFTERNOON, 2ND DAY 25 YARD POOL: - The afternoon workout started out fine with three 1000's. The first was not bad but then the roof fell in. We've experience this falloff with visiting teams in the past. Finished workout with slightly strained elbow. Trainer iced elbow for 15 minutes.

11 MAY 1968, MORNING, 3RD DAY, 25 YARD POOL: - We tried a couple of 1650's and the results were not good at all. With a short rest interval, he averaged 18.42. This is not good for Burton. Severe pain in bad elbow, whirlpool treatment.

11 MAY 1968, AFTERNOON, 3RD DAY, 25 YARD POOL: - During the afternoon we tried repeat 200's. The average of 2:08 was not good. Once again, our boys repeat better than this during season. Third day is generally the worst. I expect decrease to start any day. Bad elbow persists.

12 MAY 1968, 4TH DAY, 25 YARD POOL: - Slight pain in elbow felt during swim but not distracting. He experienced tingling feeling in extremities. Although he didn't notice lack of air, he just couldn't muster up the drive for a better effort. Not burning sensation in the lungs and little discomfort existed other than tingling. We will follow this pattern of one workout of 4200 yards on Sundays throughout stay. He hopes that the 3000 yard swim will be meaningful. Talked to Chavoor on phone and he appeared pleased with progress.

13 MAY 1968, MORNING, 5TH DAY, 25 YARD POOL: - We did a short workout this morning and Mike felt so good that we were able to shorten the rest interval during the morning workout. It's a pleasure working with him as he is ready to go on time and keeps me informed as to how he feels. Very slight elbow pain.

13 MAY 1968, AFTERNOON, 5TH DAY, 25 YARD POOL: - His average dropped for the three 1000's despite short interval. The fifth day is certainly a good day for Mike Burton. He will do better, but how much will be decided in the next three weeks.

14 MAY 1968, MORNING, 6TH DAY, 25 YARD POOL: - Elbow pain worse than Monday, whirlpool treatment. This workout on 6th day showed marked improvement over Saturday. The 1650's dropped their average. Elbow is fouling up our project and may have had an adverse effect. I wanted to step up yardage today but had second thoughts after considering elbow.

14 MAY 1968, AFTERNOON, 6TH DAY, 25 YARD POOL: - Some elbow pain. Much stronger than Saturday afternoon. His 200's showed a big drop.

15 MAY 1968, MORNING, 7TH DAY, 25 YARD POOL: - Sore elbow, diathermy treatment. We were light on the workout today. Trainer felt that he could work but that we should ease back for a day or so and watch for relief from soreness before raising distance. He did a set of 400's today which compared to his first day. They were about two seconds faster on the average.

15 MAY 1968, AFTERNOON, 7TH DAY 25 YARD POOL: - Elbow not bad this afternoon. Broken 1650 was well done with 10 seconds rest. It is the best one I've seen up

here. He did 16:32.2. I would like to have seen what he could do during the first three days.

16 MAY 1968, MORNING, 8TH DAY, 25 YARD POOL: - Elbow pain nearly gone. He continues to show improvement. His 1650's dropped their average once again. Improvement appears to be steady.

16 MAY 1968, AFTERNOON, 8TH DAY, 25 YARD POOL: - Very sore elbow. He tried a sprint 100 in the 20 yard pool for the fun of it. He did 48.8 which wasn't bad. Since Bob Nieman led all the way, I assume that this was max effort. All phases of afternoon workout showed slight improvement.

17 MAY 1968, MORNING, 9TH DAY, 25 YARD POOL: - His elbow is still sore. This morning he has been about average on most of his workout. His last effort on the 100's with short rest was his best to date.

17 MAY 1968, AFTERNOON, 9TH DAY, 25 YARD POOL: - Now he's showing signs of improving again. This is his best set of 1000's. This is the best set I've seen at this altitude. The remainder of the workout is also good. The set of 200's fly is also his best and the 50's followed a nice workout.

19 MAY 1968, AFTERNOON, 11TH DAY, 25 YARD POOL: - This 16:57.4 is the best ever in this part of the country. The pool is a new 10 lane indoor-outdoor type, however, it has several deficiencies that adversely affected his performance. The pool lighting is over the deck area rather than the pool and the turns are hard to spot. In addition, the tile on the turn stopped abruptly one foot below the surface. He said he was getting close on purpose in order to avoid missing one completely. He felt that had the turn been better that he could have gone from 20 to 30 seconds faster. I support this reasoning, since many of my other swimmers were off their normal pace for the same reason.

20 MAY 1968, MORNING, 12TH DAY, 25 YARD POOL: - No elbow pain but sore lats from rubbing. I talked to Chavoor on the phone and we agreed that I would build up workout and go to longer pool due to his excellent progress. Everything was good this morning. His 200's and his 100's with a short rest interval were his best.

20 MAY 1968, AFTERNOON, 12TH DAY, 25 YARD POOL: - Increased workout by 2000 yards today. Response to increase and altitude outstanding. Every facet of workout this afternoon was his best. 1000's superb. His average beat the 17th's and may be close to his max. His last 1000 was his best workout 1000 at any altitude. If this is true, he is better than any previous altitude study would indicate. I talked with Ed Cliaht, author of the largest study ever done on altitude and he was amazed. Not one of his 75 subjects reached a sea level performance before three weeks.

21 MAY 1968, MORNING, 13TH DAY, 100 FOOT POOL: - Very tired today. The possibilities are (1) 100 foot pool; (2) weight workout; (3) yesterday's good & long workout; or (4) altitude. After yesterday, what a blow this turned out to be. He's off everywhere, complete regression. In some aspects of today's workout he was worse than third day.

21 MAY 1968, AFTERNOON, 13TH DAY, 100 FOOT POOL: - He remains very tired this afternoon. However, we will press on for complete teardown if possible. We will then try to build him back up with a change in workouts and shorter distances. He will know when he is out of it, and I am going to wait for his acknowledgement.

22 MAY 1968, MORNING, 14TH DAY, 100 FOOT POOL: - I believe we've torn him down physiologically and this is the basic cause for poor performances. The additional, 2000 yards per day coupled with 100 foot pool appears to be breaking point. He remains tired, however, his elbow seems to be better. After several days of comparative workouts, will consider changes in distance and intervals. This workout is not as bad as yesterday. Still no acknowledgement.

22 MAY 1968, AFTERNOON, 14TH DAY, 100 FOOT POOL: - Much improved over this morning. Arms very tired. His 400's aren't as good as 25 yard pool, but they are the only bright spot in two days.

23 MAY 1968, MORNING, 15TH DAY, 100 FOOT POOL: - His 1650's show an improvement over Tuesday. 400 IM's are also better.

23 MAY 1968, AFTERNOON, 15TH DAY, 100 FOOT POOL: - He's getting bored with repetitive workouts. I am therefore going to alter workouts slightly for next 5 days effective immediately. I'm adding backstroke and breaststroke to the workouts. He feels strong but tired today. His sprints are improved, but will definitely get better.

24 MAY 1968, MORNING, 16TH DAY, 100 FOOT POOL: - His arms are still tired. This workout intended as change of pace but with short rest interval meant to be tough. This change in the style of workouts will hurt more but I'll keep changing it for eight straight workouts. If he breaks down, I'll keep up this same trend.

24 MAY 1968, AFTERNOON, 16TH DAY, 100 FOOT POOL: - This afternoon's workout is still very weak, the intervals hurt and the distance is long.

25 MAY 1968, MORNING, 17TH DAY, 100 FOOT POOL: - He feels that he is torn-down now. I suspected as much yesterday. We will take off this afternoon. This break coupled with one workout tomorrow will probably bring him around some by Monday. Elbow probably healed, but arms are like lead.

26 MAY 1968, MORNING, 18TH DAY, 100 FOOT POOL: - This workout compares with workout on Sunday (4th day) 12 May. This improvement of 17 seconds is noteworthy in that the May 12th swim was in a 25 foot pool. He had 30 less turn and they probably are worth more than 20 seconds.

27 MAY 1968, MORNING, 19TH DAY, 100 FOOT POOL: - He had off Saturday afternoon and Sunday afternoon. Should show results of rest today. Don't know what affect altitude acclimatization had on this workout.

27 MAY 1968, AFTERNOON, 19TH DAY, 100 FOOT POOL: - Elbow trouble returns. 1000's starting to come back down. The rest of the workout is mediocre.

28 MAY 1968, MORNING, 20TH DAY, 100 FOOT POOL: - He doesn't feel like he's swimming very good, but this is his best morning in the 100 foot pool. I cut workout to 6000 yards this morning in order to try to get a response this afternoon. We will emphasize broken 1650 in 100 foot pool to see if it is better than the one in 25 yard pool on 15 May (7th day).

28 MAY 1968, AFTERNOON, 20TH DAY, 100 FOOT POOL: - The broken 1650 was not as good as hoped for. He felt pretty good about the performance, probably because of the 100 foot pool. The set of 15 x 66 2/3 was by far the best of these that he has done. He would appear to be acclimatizing to the short rest. The workout of 15 May was in a 25 foot pool, however, this workout appears to be better overall. Weight workout this morning. This was a light yardage workout. Tomorrow we'll jump back to 14,000.

29 MAY 1968, MORNING, 21ST DAY, 100 FOOT POOL: - He doesn't feel particularly good this morning but workout is progressing normally. Lack of air is not a factor since he feels about the same as at sea level. I would say that this workout is much better than the afternoon workout with some small allowance for the fact that it is being administered in the morning. His butterfly work was better this morning. We tried a shorter interval but had to switch to a 30 second interval.

29 MAY 1968, AFTERNOON, 21ST DAY, 100 FOOT POOL: - Tremendous improvement in all phases, particularly the 300's. Today looks like his best day and would bear out Cliaht study results. He's still coming down and I look for more improvement. His afternoon workout brought comment that arms don't feel bad or all torn up like yesterday.

30 MAY 1968, MORNING, 22ND DAY, 100 FOOT POOL: - The improvement on the 600's is significant, however, the remainder of the workout is mediocre to poor. Everyone has holidayitis on Memorial Day, but we are going to press ahead anyway. Mike says his arms are all torn up again.

30 MAY 1968, AFTERNOON, 22ND DAY, 100 FOOT POOL: - His 200's today were

(Continued on Page 15)

HOW MIKE BURTON TRAINED (Continued from Page 12)

slightly slower than 17 May (8th day). I feel that this caused by the greater distance of the past few days as well as the 100 foot pool. Considering the fact that he's torn down, I'm not too surprised.

31 MAY 1968, MORNING, 23RD DAY, 100 FOOT POOL: — He feels fairly good today. His workout was designed to be different this morning. No pulls and he likes pulls. His times are not bad when compared to yesterday. He has some swimming company in the pool this morning and he appears to be responding to their presence. The intervals for the entire workout are shorter this morning. He's noticing the lack of air in these short intervals.

31 MAY 1968, AFTERNOON, 23RD DAY, 100 FOOT POOL: — Mike's parents were here for this workout and it was certainly one of his best. He had a short rest interval between 800's. His average time was his best, and the best I have seen here with a short rest interval. I didn't time the remainder of the workout.

1 JUNE 1968, MORNING, 24TH DAY, 100 FOOT POOL: — Mike's parents were here again. His set of 400 IM's was his best since his arrival. This was a bit of a show-off for his parents. However, he had to pay for it and the remainder of his workout was mediocre to poor.

2 JUNE 1968, MORNING, 25TH DAY, 100 FOOT POOL: — This was not the worst Sunday but I don't feel that we learned anything. He didn't get much out of it. The cadets brought him home from the dance in time for crowing rooster. I feel certain that he can do better than his best by a significant difference when he is rested.

3 JUNE 1968, MORNING, 26TH DAY, 100 FOOT POOL: — He hasn't recovered from the big weekend. He's so tired that he says that he can't make himself go. He doesn't look bad to me and I think he's swimming better than he feels. His 200's are slightly better today (almost a full second). His pulls are better today (one full second). No breathing problems and he does not notice lack of oxygen. No dizziness or side effects although workout was slow.

3 JUNE 1968, AFTERNOON, 26TH DAY, 100 FOOT POOL: — This workout was particularly tough after this morning. The repeats were boring to him so he decided to sing a song. The rhythm must have suited him since his repeats were better than average. His arms are killing him again. He claims that these workouts are much harder than at low altitude. This is exactly as expected and has a lot to do with out tailoring the workouts. He's had his first complaint of cramps (in the feet) since he's been here. This is affecting his pull times.

4 JUNE 1968, MORNING, 27TH DAY, 100 FOOT POOL: — His arms (tiredness) are still bothering him this morning. His 1650's were well done and looked good both from the physical and time standpoint. He isn't bothered by altitude at all now. No breathing problems or tingling in the extremities. He felt that his turnover was rapid and that his arms spent very little time in the air. He's getting a good grip on the water but needs concentration on pull to keep this up. Concentration goes and humming begins. IM's help to cure this repetitive boredom for him. I have cut rest interval considerably on 400 IM's. He's responding.

4 JUNE 1968, AFTERNOON, 27TH DAY, 100 FOOT POOL: — He slept between workouts. His arms are still bothering him. He's averaging his usual number of strokes per 100 feet, however, his times are slower. He's so tired he feels like he's going to collapse. He's pushing although his times remain poor. No complaint about elbow for sometime, but had had to use vaseline on his lats again to prevent irritation from rubbing.

5 JUNE 1968, MORNING, 28TH DAY, 100 FOOT POOL: — He knows he's torn down. He lacks power in his arms even though his concentration is intense. Tomorrow is his last day, however, we will press on with workout. Sherm will time trial him shortly after he's adequately rested. His 200's this morning were not good. His 500's showed slight improvement over 13th day. Breathing remains easy, requiring no more than normal effort. He now feels that he will never be able to do his sea level times but has hopes of getting reasonably close.

5 JUNE 1968, AFTERNOON, 28th DAY, 100 FOOT POOL: — Mike rested again this afternoon and apparently it helped some this time as his broken 1650 and his sprints were better than last week. His pulls were slow and still show the effect of the arms teardown. He says that the rest helped and he feels somewhat better.

6 JUNE 1968, MORNING, 29TH DAY, 100 FOOT POOL: — This is the final day. Mike returns to Arden Hills tomorrow. His performance today is average. He is still tired, but doesn't feel as bad as the last few days. His 100's were much better today than any he had completed in the 25 foot pool.

6 JUNE 1968, AFTERNOON, LAST WORKOUT, 100 FOOT POOL: — The entire workout wasn't as good as he can do when rested, however, it was certainly one of his best. Every part of the workout was strong. His last hundred of the day was a very fine 52.2 which showed a lot of strength over the 100 foot course. I feel that this last workout was a superior effort although he is very tired and shows signs of fatigue. No breathing difficulties were experienced on the short rest work. He has not hyperventilated during his entire stay (as per my suggestion) and consequently has had neither dizziness nor blackouts. He feels that he could now hyperventilate.

BURTON'S WORLD RECORD SPLITS

Long Beach, Calif. — In the rush of mailing the September SWIMMING WORLD within three days after the end of the U.S. Men's Olympic Trials we omitted the 1500 meter freestyle splits.

Here are the three fastest 1500 splits ever:

Burton at Long Beach 9/3/68:	60.0,	2:04.0,	3:08.1,	4:13.2,	5:18.2,		
Kinsella, Long Beach 9/3/68:	60.8,	2:04.8,	3:09.2,	4:14.2,	5:19.5,		
Echevarria, Santa Clara 7/7/68:	60.8,	2:07.2,	3:13.4,	4:20.0,	5:27.1,		
Burton:	6:23.1,	7:28.5,	8:34.3,	9:39.4,	10:44.7,	11:49.9,	12:55.2,
Kinsella:	6:25.1,	7:30.7,	8:36.5,	9:42.5,	10:48.8,	11:55.3,	13:02.7,
Echevarria:	6:34.6,	7:42.2,	8:48.5,	9:52.4,	10:58.2,	12:03.3,	13:09.6,
Burton:	14:00.3,	15:06.0,	16:08.5,				
Kinsella:	14:10.3,	15:18.1,	16:24.1,				
Echevarria:	14:16.7,	15:24.0,	16:28.1,				

HALL, COLELLA, 'OWN' REGION XII CHAMPIONSHIPS

Portland, Oregon — highlight of the AAU Region XII Long Course Championships was that out of 13 women's events nine of them were won by a pair of girls named Kaye Hall, Tacoma Swim Club, and Lynn Colella, Cascade Swim Club.

Miss Hall, the backstroke whose world class times have made one of the United States' Olympic hopes, took four victories. In the spring freestyles she left the fields behind, winning the 100 meter in 1:03.8 and the 200 m. in 2:17.5. The backstroke events, of course, were easy romps, as she swept her specialities, 1:08.2 in the 100 and 2:29.4 in the 200, both new association records. But her big story was the lead-off leg of the 400 m. medley relay as she swam the 100

in 1:07.5, two tenths of a second below Cathy Ferguson's American citizens record set in 1964.

Miss Collela distinguished herself with her versatility. she set association records in the 800 m. free, 9:48.9, 100 m. breaststroke, 1:29.7, 100 m. butterfly, 1:20.7, and 200 m. individual medley, 2:34.9, and also won the 200 m. breaststroke, 2:54.3. In her medley win, however, she had to share the title with Leal Whittlesey, Multnomah Athletic Club, who touched home at the same instant and recorded the same time. Miss Whittlesey, then went on to win the 400 m. IM in 5:34.0.

The fast rising backstroke specialist, Jack Horsely, Red Shield Tritons, broke a pair of Association records in his victories in the 100 m. backstroke, 1:02.4 and 200 m. backstroke, 2:11.7. In a change of pace he completely outclassed the field and notched a third record in the 1500 m. free, 16:53.0, with the runner-up nearly a full minute behind his pace.

Versatile Bruce Richards, TSC, won both medleys. He took the 400 m. in Association record time of 4:59.4 and then won the 200 m. in 2:22.3 with John De Roest close behind at 2:22.7.

Record setting seemed to be the thing to do at the meet, and Region Twelve marks fell in all but three mens events. Bob MacDonald, David Douglas Swim Club, got his record in the 200 m. free, 2:04.7, after Mike Weston, Unat., broke his own mark in the 100 free with a fast 55.9.

The remaining freestyle mark was also bettered as Jeff Schureider, RST, smashed Mike Burton's record in the 400 m. with a 4:24.7 mark.

Rick Collela pushed Mike Dirksen, DD, to a record in the 100 m. breaststroke, 1:13.8, and Dirksen then returned the favor by staying close enough to Collela, CSC, in the 200 m. to nudge him past the record in a time of 2:39.4.

OTHER WINNERS Men 100 m butterfly Jerry Newman, MAC, 1:01.1. 200 m butterfly, Matt Evans, TSC, 2:20.8. Women 400 m freestyle, Susan Harris, CSC, 4:55.7. 1500 m freestyle, Ann Tasnady, unat., 19:02.5. 200 m butterfly, Sally Simonsen, MAC, 2:40.1.

YMCA POLO HIGHLIGHTS

by Chuck Hines

Des Moines, Iowa Tech High, led by husky guard Rick Henrichs and quick-handed goalie Jim Hawk, recently won its fourth consecutive Des Moines all-city water polo championship. However, the Hoover High team is favored to replace Tech at the top in 1969. The five high school water polo teams in Des Moines are actually informal, after-school Hi-Y clubs which are affiliated with the Des Moines YMCA Water Polo Club, which provides leadership, equipment and competitive opportunities. The volunteer coaches from the Y and the 90 or so youthful participants from the five schools are working toward the day when water polo will become a fully-subsidized, fully-recognized interscholastic sport in Des Moines and throughout Iowa. Despite the informality of the present program, Des Moines has developed a number of All-Americans and the 1968 National Y championship squad.

The Canton, Ill., YMCA water poloists completed their second year of competition with a 10-5-3 record, and the Canton Y boys' unit handed Des Moines Tech High its only loss of the year, 5-3.

Since 1960, forty-six in sixteen states have promoted water polo teams and competition. National YMCA men's championship teams since '60 have come from St. Louis (1960, 1962, 1963, 1965, 1966, 1967), Detroit (1961), Chicago (1964) and Des Moines (1968). A National YMCA women's championship competition was initiated two years ago with the winners being Davenport (1967) and Houston (1968). Now there is talk of having a separate National Y championship tourney for boys as water polo popularity continues to increase.

RELAY SWIFTIES — Multnomah Athletic Club's (L-R) Leal Whittlesey, Linda Fairchild, Ann Seidel, and Majorie Meek were fast freestylers in Portland, Oregon's Jantzen Open Swim Meet.

