

the United States in per capita consumption in 1975.

The purpose of this study was to collect the factual information of the past so that it will be available to anyone who wishes to use it for whatever purpose. This is the information about energy consumption that we know. What energy consumption will occur in the future is speculation from whatever source and should be viewed as such.

## ELETRICAL

Under a contract from the Department of Communications, Professors Atherton and Balasubramanian of the Electrical Engineering Department have been investigating various advanced techniques for the control of satellites.

This on-going project which was started in June 1975 was initially concerned with the stability of the Communications Technology Satellite (CTS), also known as Hermes, launched in January 1976. Under nominal on-station conditions, an on-board attitude control system maintains the orientation of the spacecraft roll, yaw and pitch with respect to earth, and the solar arrays track the sun. The large power requirements of the craft results in structures with highly flexible appendages and, consequently, the on-board control loop can support sustained oscillations or 'rocking' of the craft. The study involves prediction of such oscillating behaviour and possible methods of reducing it in future designs.

Future generations of satellites will require more precise pointing accuracies than was possible with CTS. For example, yaw is maintained to an accuracy of approximately 1 degree by the attitude control loop in Hermes; whereas in future designs, an accuracy of about 0.1 degrees may be necessary. At the present time, studies are being undertaken on possible schemes for the determination and control of yaw in future satellites as well as their on-board implementation.

## Survey Camp

The Engineers have always been an organized and enthusiastic unit on the U.N.B. campus. In 1902 the engineering students formed a Society for "the benefit of the University" and to emphasize "the growing importance of the Engineering department." This was the first of many such Societies, and today only the Foresters can claim an equal degree of success in their student organization.

Much of the early cohesion among engineers can be explained by the engineering camp. First held during the late summer of 1899, the Surveying Camp included all engineering students and thus, even before the rest of the campus body returned in the fall, they were familiar with each other and ready to take on the rest of the world.

Mr. H. M. Eastman of the Class of '02 gives this account of that first engineer camp.

Last year it was decided to add to the regular Engineering Course a Summer Surveying Camp.

The first of these camps was



Early survey camp



A view of the printer and card reader

Photo Brewer

held in September of the present year; and to judge by the experience of this one, they will soon be a popular feature of the Course.

On Saturday, September 16, we started from the Queen Hotel, in Fredericton, in two double teams. The party consisted of Professor Dixon, nine Engineers and the cook, Walter Brogan. Owing to the costumes of the party we got out of town very quietly, but once fairly on our way we relaxed and songs and jokes were in order. About one o'clock we stopped, ate our lunch and fed the horses. About three o'clock we arrived at the camping place which was situated in Myshrall Settlement on the Bank of Kelly's Creek. The Indian name of the brook is Little Chichawagaan. Hence the name of the Camp.

While waiting for the supply team, a flag-staff was cut and put up, wood cut, and a water-hole built in the Creek. When the team arrived we soon had the four tents

pitched, the stoves set up, a dining table built, the precious "grub" carefully stowed away, and our flag run up, a white burgee, with the inscription "U.N.B. Engineers" in red letters.



The largest tent was used as a kitchen and dining-room. Next to it came the office, in which the draughting table and surveying instruments and books were kept

and in which Professor Dixon slept. The other two were sleeping tents.

Sunday was largely spent in visiting and receiving callers. The people of the settlement welcomed us with open arms as the advance-guard of the St. John Valley Railroad.

On Monday morning the real surveying was begun.

On the way to the starting point which was four miles from camp the party attracted considerable attention, owing chiefly to our apparel and the instruments, rods, axes, and lunch pails which we carried.

At one house we heard the doors being locked for protection.

The first part of the line ran over cultivated ground, in one place passing perilously (for the owner's sake) near an orchard. At twelve o'clock "cookee" Legere built a fire and boiled tea. When this was ready he gave a yell which brought every man on the double-quick to partake of what

Macreadie called a "temperance picnic". After an hour spent in disposing of grub, poetry and jokes, we again went to work and kept at it until five. Then the instruments were packed and taken to some neighbouring houses and the party started for camp. A native of the region told us that by going "cross lots" we could make the trip in thirty minutes. We took the advice but were one hour and twenty-five minutes on the way, arriving at camp at nearly seven with a general knowledge of the country and blessings for the native.

In a few minutes we were giving Brogan some idea of the capacity of the men he was cooking for, and a sight of the way the pancakes, bacon, corn, potatoes, and cake, disappeared would have sent a hotel proprietor into convulsions. After tea the camp fire was built and lighted, and after the notes had been copied from the field books into the office copies, the party gathered around the fire and talked, joked, and sang until bed time. Then the blankets were arranged, boots kicked off, and in a few minutes nothing was heard but snores. The cook's alarm clock started us the next morning and soon every man was on the way to the brook with soap and towel, for the morning wash. After breakfast the axes were ground, the lunch packed, and another day's work was begun.

Only one day was lost on account of wet weather and the time was occupied with plugging, reeding, mending and writing letters.

One evening during our first week in camp a dance was held in one of the houses in the settlement. We received a pressing invitation to attend and a majority went. The President of the Sophomore class distinguished himself on this occasion by capturing the prize of the evening, viz., the school-teacher.

For a mascot the contour men captured a snake nearly three feet long. This was proudly carried to camp by Macreadie wrapped in his felt hat. The snake was placed in a bottle, but became cramped for space and one night pushed the cork out and left for parts unknown.

Although we saw several partridges and deer, we were not able to capture or slay either. The only game the two revolvers and shot gun brought down was a small snipe.

Probably the most pleasant feature of the outing was the evening camp fire. Here the laughable incidents of the day were gone over again, College and popular songs were sung and jokes, fresh and stale, were cracked.

The only musical instrument in camp was a mouth organ but it did excellent service. Those fellows who attend next year's camp should see that more instruments are taken if possible. Another thing we lacked was a good looking-glass. While the bottom of a new bread-pan makes an excellent substitute, it is apt to tarnish.

On Thursday, the 28th, we awoke good and early. After breakfast the tents were taken down and rolled up, valises were packed, blankets bundled up and these, with all the hardware, loaded into a hay-rack which drove away and left us. About half past ten the teams from the Queen Hotel arrived, we climbed aboard, and Camp Chichawagaan was a pleasant memory.